BRITISH MEDICAL JOURNAL

LONDON SATURDAY JUNE 25 1960

British Medical Association

ONE HUNDRED AND TWENTY-EIGHTH ANNUAL MEETING, TORQUAY, 1960

President's Address

COMMONWEALTH AND COMMON HEALTH

BY

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It is surely a unique privilege that my first duty as President of the Association should be to express to you, Sir—a brother surgeon, if I may say so—our great delight in and appreciation of your presence here to-day. One fully realizes that in the midst of your "whistle-stop" life, so selflessly, whole-heartedly, and enthusiastically devoted to the well-being of the people of Britain and the Commonwealth, such a visit is indeed a generous gesture.

I can assure you that its intrinsic value to us as a profession is beyond price, for it expresses what, over the years, we have come to realize, through your active interest and personal participation, is an ideal very near your heart—that of a great race, a great people: great because they are healthy, fit, and happy.

I myself am more than honoured you should have inducted me into this Presidential Chair. It is indeed a red-letter day among the many that it has been my privilege to spend with Your Royal Highness in this country and in many parts of the world, chiefly the Commonwealth world. It would seem that a common belief that through the potent media of both medicine and sport great good can be forthcoming, both nationally and internationally, has led to a common participation in such varied interests as those of the Olympic Games, the British Empire and Commonwealth Games, the Amateur Athletic Association, the Central Council of Physical Recreation, the Royal College of Surgeons—and now the British Medical Association.

I hope I may also say—in all humility—that it has led to, on my part, an intensely valued friendship where sound advice, keen enthusiasm, and ever-present stimulus have never been lacking.

It is, I think, of interest, too, to note that when the policy-makers of the Association decided that the President should not necessarily be a resident of the city in which the Annual Meeting was held, the first so-called "National" President was you yourself, Sir—and the first medical one is here in Torquay, to which delightful city he is, in so many ways, greatly indebted.

One cannot help noticing, too, the Commonwealth flavour that has crept into the Association's activities of late, and how fitting this is when one realizes that the immediate Past-President probably knows more of the Commonwealth—and knows it better at first hand—than any other member of the Association. His Royal Highness's Presidency of the Canadian Medical Association contemporaneously with that of this Association; the presence of a New-Zealand-born President in this lovely part of the Home Country; and the fact that the next meeting of the Association will be held in Auckland, New Zealand, with subsequent visits to Australia and

[Torquay Times and Devonshire Press, Ltd.

H.R.H. The Prince Philip, Duke of Edinburgh, inducts Sir Arthur Porritt as President of the B.M.A. at Torquay on June 20.

other parts of the Commonwealth, prompted half the title of my official address; the other half, with all due acknowledgment, is borrowed from a toast to which His Royal Highness replied at Guildhall last year.

"Commonwealth and Common Health"

Study and consideration of previous Presidential Addresses leaves me with a due sense of humility. The scientific, historical, and philosophical discourses of the past years cover an extraordinarily wide field of interest, and are couched in terms that do credit—even honour—to our English tongue. The two guide-posts of my own Address—Commonwealth and Common Health—are, by comparison, in the nature of a "credo." I believe sincerely in both, and I believe fervently in *the* Commonwealth and *our* Common Health. Both are essentially founded on the family basis, and the ideal of family has been one of the strongest influences for good throughout all ages. Surely it is impossible to have a commonwealth without a common health, and let us remember that common health includes moral and mental health as well as physical. Both Commonwealth and Common Health are to-day rapidly expanding, and consequently each with its widening vista is changing in character. Perhaps a brief study of the two as entities, and even more so in constructive and practical interrelation, is not without interest and purpose.

The Conception of Commonwealth

The original meaning of "commonwealth" has now been largely forgotten, but the definition of weal as "welfare, prosperity, and good fortune" is relevant to the conception I am trying to develop to-day. For, surely, in the common good of all is included, as a vitally important part, the common health of all. Prestige and power, money and material possessions, have little value in the absence of mental and physical well-being, on either a national or an individual level.

To-day, commonwealth—and I will not dilate on the first British Commonwealth of Cromwell (1649–60), pertinent though in many respects is its history—implies an association of nations, not necessarily of the same race, creed, or colour, individually independent but communally interdependent through the binding forces of common tradition, interests, and economy. It is salutary, perhaps, to remember that, in addition to our own historic Commonwealth, united through the Crown, there have developed, in more recent times, such groups as N.A.T.O., S.E.A.T.O., and even, if we are to be unbiased, the United Arab Republic and "Iron Curtain" countries. A modern commonwealth is a concert of convenience—quite different from and much greater than an Empire. Such relatively loose unions of nations are achieved through the mechanism of individually responsible governments in friendly contact and co-operation.

In alignment with these ideas, the common health of a commonwealth is achieved through the association of a number of individually responsible doctors in friendly contact and co-operation, united through the medium of a vocational desire to save life, alleviate suffering, and actively promote well-being. It is only too obvious that at the present juncture these ideals, both in common wealth and in common health, have not yet been fulfilled; but in this mechanistic, mercenary, and iconoclastic world of to-day we need the stimulus of ideals more than ever—a stimulus to take practical and constructive steps that will bring the ideal within reach.

Basic Differences

As more and more governments are accepting, in varying degrees, responsibilities for part or for all the common health, the basic differences between the organization and administration of the two become more obvious. So, also, does the vital necessity of establishing a working relationship, in a friendly atmosphere, between the elaborate machinery of government, guarding the national economy, and the medical profession (by its very nature a group of individualists), guarding the national health. That the latter, relatively a very small proportion of the community or of the electorate, lacks an effective mechanism for dealing efficiently with the former, is a stark reality which the last decade—the years which have seen the greatest experiment in the provision of and control of the national health—has heavily underlined. The inherent impersonality of government demands (if active and positive national health are to be achieved) the strongest possible professional approach. One does not doubt the will is there on both sides, but the way has proved unexpectedly complex. This points to the necessity for a more potent and all-embracing amalgamation of the present numerous pleomorphic associations which represent the profession. This, after all, would be only in keeping with the present trend in governmental co-operation in the Commonwealth, where more intimate and continuous consultation and co-ordination of interests is, at all levels, becoming more frequent.

To the doctor, whatever sort of a doctor he may be and whatever medical association he may be represented by, the essential and primary concern is the patient—the patient who must be cured of his ills, the patient who must be prevented from becoming ill. It is this almost primitive personal approach which has proved so difficult to reconcile with the "cut-and-dried" machinery of government. Much good will and genuine understanding, many cool heads and willing hearts, are vital to both sides if the primary and basic ideal is to be achieved.

Given these desiderata, the task should not be impossible; for much information—not only in this country but from other countries in the Commonwealth and other nations in the world—is already and steadily forthcoming. A dozen or more methods of bridging this difficult gap between departmental control and professional freedom have been and are being tried out. It should not be impossible, in due course, to find for any particular national and economic environment the optimum system, for the patient and for the doctor, if sufficient breadth of vision and elasticity of method are maintained.

Before adding a little more colour to the broad canvas I have been trying to paint, perhaps mention should be made of another and important aspect of medicine, the international.

Common Bonds

Consideration of matters of health and the problems relevant thereto is undoubtedly a great link between nations. It ranks high with the arts, science, and sport as universal common bonds of interest, understanding, and friendship. And it is worthy of note that, in all these spheres of activity, the *personal* element predominates. Hence, if the multiplication of numbers of

individuals or small groups of individuals with mutual interests can achieve an increasing degree of friendly understanding, then the power for good of these interests may prove a greater force in producing the millennium of universal peace than even diplomacy, politics, or economics.

To revert to the conception of the parallelism of common wealth and common health, our own British Commonwealth is a classical example of the potency of a union founded on common traditions and interests. That such a heterogeneous—one might almost say motley — group of peoples — independent nations, republics, self-governing dominions, colonies, dependencies, and protectorates—should be able to form one body politic is in itself an astounding fact. In our case it is due first and foremost to the existence of the Crown. Let us remember that, in 1952, Her Majesty adopted the superbly simple title of " Head of the Commonwealth," thus ensuring in one supreme person the union—or perhaps one would better say the partnership—of a number of autonomous and democratic units. This is our greatest British asset, and it is of importance to appreciate that, in this group of varied peoples, Britain herself holds leadership without either military or political power. Her responsibilities are shouldered through the advocacy of principles and policies. General advance in the public welfare—the *res publica* of Roman times—of this medley of peoples comes through the inspiration of increasing co-operation, through the promulgation of liberal aspirations, through common and generous sacrifices, through the all-pervading power of fellowship, friendship, and deeper understanding. The peoples of the Commonwealth are, at the same time, witnesses of a glorious if chequered past, participants in an intensive and stimulating present, companions of an intriguing and comprehensive future.

The idea of commonwealth gives us, in one composite whole, a proud heritage, a potent stimulus, and a far-reaching incentive.

Changing Medicine

And how closely parallel to this runs the development of medicine—a burgeoning of evolutionary changes, an incredibly rapid opening up of new spheres of knowledge, an increasingly productive co-operation between different branches of medicine and between different national systems of medicine, and an ever-deepening sense of responsibility to the population as a whole as well as to its individual parts, for its communal well-being. If the chief function of government is to secure for those living under its jurisdiction the best possible conditions of life, then the part to be played by the profession in achieving this aim is to-day not only of great magnitude but of crucial importance. There seems every reason to believe that the art and science of medicine will rise (and in fact is amply rising) to the challenge of the modern world.

The increasing use of radioactive isotopes, both for diagnosis and for therapy ; the application of electronics to medical science ; the development of complicated machines for the maintenance of extracorporeal circulation ; the intensification of methods of treatment by radiation ; and the vast explorations into the spheres of biochemistry and biophysics, with their almost daily advances in the use of antibiotics, the steroids, and the endocrines, are but a few examples of the pulsing strength of medicine to-day.

In this dynamic and materialist world the basic sciences have come more and more to the fore. In my own specialty of surgery a major revolution has taken place in the last twenty years. It has, to a very large extent, become the practice of applied physiology, its technical exactitude becoming every day further enhanced by the use of scientific methods and machines. In the very drama of this intensely stimulating scene there is the danger at times of forgetting the central figure—the patient. For medicine is still an art as well as a science. Has the art deteriorated in the presence of the efflorescence of science ? Does the art still sufficiently control and assess the science in the light of the personal problems of the patient ?

It is right that we should have a biological rather than a pathological concept of the patient—for the patient is more important than the disease from which he suffers, though the study of disease is in itself a fascinating subject. There are many to-day who feel we are moving —perhaps not so slowly—towards a more spiritual conception of man and his destiny, and who quite reasonably object to the spirit being made the subject of laboratory control.

What of the still relatively unexplored fields of all the gradations of mental illness ? And of the so-called " psychosomatic " diseases ? The large gaps in our knowledge are made even more conspicuous by the remarkable success with which scientific discoveries and developments have filled the gaps of our ignorance of physical disorders.

Health, over the ages, has been variously defined—never perhaps comprehensively. There seems little to better the old time-worn adage of *Mens sana in corpore sano*, for it expresses the ideal of soundness in both mind and body—the unconscious happiness of the whole man. Every civilization has had, in varying degree, its pipe-dream of perfect health and happiness ; none has yet achieved it.

Far-reaching Effects

Every discovery of major importance has brought in its train difficulties, dangers, and even disasters of its own. The antibiotics provide a classical example. That they have reduced the mortality in certain diseases a hundredfold is a fact of world-wide significance and importance—but that they have increased morbidity through the production of resistant bacterial strains and that they have even been responsible for allergic deaths equally cannot be denied.

And how far-reaching are the effects of modern discoveries is well exemplified by figures recently quoted. In this country, in 1800, one child in every three lived less than a year—a fact that can be corroborated by visiting any ancient church or churchyard. Now, only one in thirty-three lives less than a year. Again, in 1850, those under the age of 15 outnumbered those over 65 by 7 to 1 ; now the figure is 2½ to 1. And, in further fields, it is rather startling to realize that to-day the annual increase in the population of India is greater than the annual increase of the whole world in 1914. The challenge varies in its presentation, but it is always present.

And so we come again to wider considerations, and considerations in which governments must have vital and primary interest: those of population, its control and dispersal ; and of food, its composition, availability, and distribution. In these spheres, as in so many others,

the problems of responsibility for the common weal seem so closely to link the government of a people with the medical profession. How can this linkage be most harmoniously and efficiently attained ?

Differences in Ideology

In 1947 the then Minister of Health wrote an open letter to the profession, preliminary to the institution of the National Health Service. In it he wrote the following words: "Differences of opinion as to means and methods are important, but never insurmountable, and cannot conceivably be allowed to override the main objective—the welfare of the men, women, and children whose care the profession undertakes and who are wholly dependent on that care. A sincere co-operation between the profession and the Minister can ensure the greatest Health Service this or any other country has ever known ; a failure to co-operate can redound only to the detriment of the people whom both wish to serve." He professed the desire to bring the profession right into the direct administration of the Service.

This statement was without doubt made in the best of good faith—even, perhaps, with the euphoria of Welsh idealism. What a tragedy it is that this conception of equal partnership between government and profession for the eminently praiseworthy purpose of ensuring the well-being of the nation should have failed so dismally. For let us be quite frank and appreciate the fact that the system initially envisaged has not worked as it should have worked, and the test of time (and reasonable time, surely—eleven years or more) has shown basic differences in ideology sufficiently strong at times to threaten the ruin of a superb ideal. That the absence of co-operation, so essential to the smooth working of the Service, has not so far, as Mr. Bevan said, "redounded to the detriment of the people whom both wish to serve" is evidence that there is still a genuine desire to achieve some measure of success.

But there is no doubt that the original idea of partnership has been steadily and slowly—almost insidiously—displaced by what has been aptly called the "employer–employee relationship," the profession being the employee. No one in his senses would belittle the intrinsic value of the Civil Service in dealing with the organizational machinery of the country, but those very stereotyped methods which ensure its success in so many material fields have been the basic cause of its relative failure to cope with a service which is essentially concerned with people, not things. And, when one appreciates that those people are, in fact, patients and doctors, joined in the Health Service in a peculiarly personal relationship, then it becomes only too evident that an impersonal Government department is not the right or the best mechanism through which to administer it.

There must be very few in the country who would wish to see the abolition of the Health Service, but there must be a vast number who would like to see infinitely less red-tape and regimentation with much more personal responsibility on the part of both doctor and patient. Because they have had some means and better opportunities of voicing their disquiet at the trend of events, doctors have received perhaps undue and certainly unwanted publicity. This has given an unfortunate bias to the never-ending and largely unproductive discussions between the profession and its Civil Service administrators. What the doctors have been seeking all along are the right conditions and the best facilities to allow them to give optimum service to their patients.

And what have we heard of the patients ? By what method can they voice their appreciation or dislike of the existing Service ? They, too (and they are infinitely more numerous than their doctors), are in danger of losing some of their personal freedoms—surely a basic heritage in this country. And this happens not from any deliberate attempt to enslave a profession or its clientele but because a departmental mechanism is not geared to cope with the humanities.

And so, most unfortunately, instead of a partnership, there has been engendered an atmosphere of distrust, if not at times of actual antagonism. It surely behoves us, who love our calling, to try to dispel these clouds ; but can a satisfactory relationship be established without a major change of policy at governmental level ? A reorientation of outlook at departmental level and a freshly sympathetic appraisal of administrative difficulties at professional level are needed if the trend of the past years is to be reversed. Can the ideal of equal partnership be fulfilled ? If the ideal could be put into practice, it would solve, with minimum disturbance of existing machinery, many of our present difficulties. Recent reports would seem to have gone some way towards this desirable end, but the implications involved in suggestions made have still to be assessed, chiefly in the light of professional control and control of the profession. For partnership to be achieved, the Ministry would have to become far more cognizant of the problems of the periphery, both in practice and in hospitals. Only then could it produce a liberal policy, allowing for more delegation of responsibility to the periphery, and, at the same time, formulating centrally a co-operative and co-ordinating mechanism which could offer, on the solid basis of knowledge acquired of local problems, both an incentive and a stimulus to the development of a service.

The Profession's Part

At the same time, it would seem that the profession must put its house in order to the extent of finding a way in which it can speak with a unanimous voice to its governmental department. This, of course, considering to what a degree we are a group of super-individualists, is not as easy as it sounds. I would be sadly lacking in my duty to-day if I did not say, in this connexion, how much one admires the sterling efforts of this Association to which we all belong for the way it has represented us over the past years. Its task has been indeed an onerous one, and often a most uncongenial one ; the work involved has been prodigious—the perseverance it has shown most praiseworthy. One trembles to think what might already have befallen our beloved profession without the constant and sturdy intervention of the B.M.A.

And yet its voice—albeit a cogent one—is not the only one to which the Ministry has given an ear. The Royal Colleges and Corporations, and many other lesser medical bodies and associations, have spoken time and again—sadly, not always with the same voice ! Even within the B.M.A. itself there are what are called autonomous bodies, such as the General Medical Services Committee and the Central Consultants and Specialists Committee.

This whole tangle of professional bodies is confusing to both profession and public, and makes little sense to the onlooker from other countries. As we have unfor-

tunately seen, this makes it easy for the Government to drive in wedges between one professional group and another when its purpose is suited. Surely something should be done to make the profession one composite whole so that it can face its employer, the State, with all the strength that the combined wisdom of its *élite* can give it in maintaining "the honour and interests of the medical profession."

Charles Hastings, our founder, used the words "medical profession," be it noted: not members of the B.M.A. Could not the Council of the B.M.A., by only slight modifications of its constitution, be made a real "council of the medical profession" by ensuring that of right the Royal Colleges and Corporations are adequately represented on it just as are the medical branches of the armed Forces and other autonomous bodies?

Such a council would by its very comprehensiveness carry enormous weight, for a denial of its advice or opinion would be to take almost impossible risks with the nation's well-being.

A Wider Outlook

Or, finally, should we widen the vista of possibilities still further and consider an idea that has been mooted before but has perhaps not received the attention it deserves—that of an independent corporation? It is only too easy to envisage the difficulties of such an administration; but difficulties exist only to be overcome, and there exists ample precedent in the shape, for example, of the Arts Council, the University Grants Committee, the British Broadcasting Corporation—and now the Post Office.

What such a scheme implies in essence is the disbursement and application of public moneys by an independent body without the intervention of departmental machinery, and without the need for a Minister to be answerable to Parliament for the day-to-day conduct of a service. Given the right representation in the governing board of such a corporation—and in medicine this would, of necessity, mean at least equal partnership of the profession—there should be possible a flexibility of policy much more in keeping with the human objects and ideals of medicine. Even more important, it would lift medicine out of the realm of party politics—an influence which has bedevilled the National Health Service from before its inception.

It may be said that the monetary sums involved are vast—too big to be handled by an independent body. Surely the very opposite is the case, and a small group of competent and responsible individuals are much more likely to have an intelligent grasp of the values of health and of the problems of disease, and so to spend money sensibly in the promotion of the one and the cure and prevention of the other.

Where are commerce and industry, agriculture, labour, or defence without efficient health services? And yet, look at the status of the Ministry of Health in the departmental hierarchy to-day. The departmental mind is restrictive and festooned with regulations: medicine needs a creative mind to guide it along its path. And more deep-rooted and essential than all this is fear of the already obvious trend of the Department to control the profession—so far perhaps only administratively, though there be some who would query even that. Let us remember that, within recent living memory, a government in another country took over control, both administrative and clinical, of its profession and provided the greatest blot on the escutcheon of medicine in the history of the world. Professional integrity and professional freedom are, for the sake of both doctor and patient, to be preserved, literally and metaphorically, at all cost.

Conclusion

This twentieth century of ours has been a weird and bizarre mixture of primitive horror and almost incredible progress in whatever direction one looks. The acceleration of this progress has been almost frightening. Even the problems of the 1950's will need a "new look" in the 1960's. We move on rapidly into the unknown; that many new vistas are opening and will open up is inevitable; it will not be easy for us either to measure or to measure up to these advances spiritually, physically, or economically. One essential necessity will be the maintenance of that unquenchable desire for freedom which is such a fundamental characteristic of our nation and our profession. Let us hope that, in this new civilization, the art and science of medicine will fulfil its destiny as one of the most important developing forces—that the *common health* may be welded into the *common wealth* to the advantage of all its peoples. And to this fervent hope let there be added potent action.

THE MENTALLY DEFECTIVE TWIN

BY

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AND

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The purpose of this survey is to ascertain the incidence of members of a twin pair among mental defectives, and to examine reasons for any discrepancy between this incidence and that in the general population.

For various reasons it might be anticipated that twins would be more liable to be affected by mental deficiency than single-born children. In the first place, twinning in humans is somewhat unusual and, particularly in monozygotic pairs, suggests a tendency on the part of the zygote to behave in an unorthodox manner. It might therefore not be surprising to find an excess of developmental abnormalities in such cases. A second, and perhaps more cogent, reason is that twin pregnancy may impose an additional burden on the mother, so that any marginal defects in her capacity to nourish the embryo would be exaggerated. A third consideration is the greater risk of injury at birth in multiple pregnancies. Lastly, twin babies tend to be small and therefore exposed to the same risks as premature ones; included among these is a greater liability to brain damage by way of conditions like neonatal jaundice.

Some indication of the greater risk for the products of multiple pregnancy is afforded by the stillbirth rate of 53 per 1,000, for multiple births, compared with 23 per 1,000 for all births (Registrar-General, 1956), and by the much higher neonatal mortality in twins (Yerushalmy and Sheerar, 1940).

Incidence of Twins in the General Population

Of the total of 667,811 live births in England and Wales in 1955, 15,989 were twins, an incidence of 1 in

41.7 (2.4%) (Registrar-General, 1957). The number of twin maternities registered was 8,437 against a total of all maternities of 675,026, or 1 in 80. The slightly lower incidence of live-born twins below the 1 in 40.5 expected represents the excess of twin stillbirths over single pregnancy stillbirths.

Sandon (1957) studied the data available on excess mortality in twins and estimated that, over the first 10 years of life, 85% of individual twins survive compared with 95% of all children born, the major part of this difference being attributable to the neonatal period. On the basis of the Registrar-General's (1957) figures quoted above, an excess mortality of individual twins of this order would reduce the incidence of twins from 2.4% at birth to 2.1% by the age of 10 years.

The frequency of twinning increases with maternal age up to 37 years and thereafter falls (Lotze, 1937). The variation seems to be entirely attributable to dizygotic pregnancies, monozygotic ones remaining constant at different maternal ages. In European populations, nearly 30% of all twins born are monozygotic (McArthur, 1949, quoted by Smith and Penrose, 1955).

The incidence of twins also varies in different countries. For example, compared with England, it is said to be lower in Japan and higher in Chile (Gedda, 1951). In the case of Japan the low incidence seems to be due to shortage of dizygotic pairs (Komai and Fukuoka, 1936).

Incidence of Twins Among Mental Defectives

Source of Data

The present survey concerns patients in the Fountain Hospital, London, and the Ellen Terry Home, Reigate. Both admit children with severe mental defect (idiocy or imbecility), an occasional patient proving to have an intelligence level close to, or in, the educationally subnormal range.

The Ellen Terry Home admits only blind mentally defective children from all parts of England and Wales, whereas the Fountain Hospital admits all varieties of severe mental defectives (including some blind children, but with no bias in that direction), mainly from London and Surrey. The population from which patients at the Fountain Hospital are drawn is somewhat more cosmopolitan than that of England and Wales as a whole.

Both the Fountain Hospital and the Ellen Terry Home usually admit patients at the age of 4–5 years. By this age the excess mortality of twins, as a result of the differential stillbirth and neonatal death rates noted above in the general population, is likely also to have operated in mental defectives to reduce the incidence of twins.

In view of the possibility that social factors influencing admission to a mental deficiency institution might affect the proportion of twins admitted, the incidence of twinning in a representative group of mental defectives living at home in London was also determined.

Method and Results

As a preliminary survey, a random collection of 230 social histories, based on interviews of parents by one social worker, of patients at that time (January, 1958) in the Fountain Hospital was studied to determine twinning.

This was followed by an examination for twinning of 200 consecutive admissions to the Fountain Hospital covering the period January 1, 1955, to November 21, 1957. This period was chosen as it provided the most complete case records available at the time of the study. Because of the difference in incidence of twinning between the preliminary survey and the 200 consecutive admissions (see Table I), a further 200 consecutive admissions to the Fountain Hospital covering the period February 5, 1953, to December 31, 1954, were similarly studied.

At the same time, 121 consecutive admissions to the Ellen Terry Home, covering the period September 10, 1948, to August 5, 1958, were scrutinized, since it was thought that blindness might have some special relationship to the problem.

In all the consecutive admissions, three main sources of information were used to determine twinning—namely, the pre-admission history prepared by the local authority, which includes a list of siblings; the social history prepared by the social workers attached to the Fountain Hospital; and the questionary sent to parents at the time of admission which includes the specific question "Was the patient a twin?"

Further, the London County Council records of *all* mentally defective persons living at home under statutory supervision on September 29, 1959, in the London boroughs of Lewisham, Southwark, and Camberwell were examined for twinning. These boroughs probably contain a representative cross-section of the population of London. The records included subjects with ranges of mental defect from idiot up to educationally subnormal level. About two-thirds were over 16 years old. A total of 659 records were studied, from which 20 were excluded because the required information was not available.

The results are shown in Table I.

TABLE I.—*Incidence of Twins in Fountain Hospital and Ellen Terry Home and in Mental Defectives Living at Home*

	No. of Twins	%	χ^2‖	P
Preliminary survey:				
230 patients in Fountain Hospital (January, 1958)	14	6·1	7·30	<0·01
Survey of consecutive admissions:				
To Fountain Hospital: (*a*) 200 patients (1955–7)	8	4·0		
(*b*) 200 patients (1953–4)*	11	5·5	4·8	4·54	<0·05
To Ellen Terry Home: 121 patients (1948–58)†	10	8·3	10·71	<0·01
Survey of non-institutionalized mental defectives:				
639 subjects living at home in London (September, 1959)‡	32	5·0	7·26	<0·01
Expectation in general population§:				
At birth		2·48		
In later childhood		2·18		

* This series also contained 1 triplet, bringing the incidence of multiple births to 12 (6·0%).
† This series also contained 2 unrelated triplets, bringing the incidence of multiple births to 12 (9·9%).
‡ This series also contained 2 unrelated triplets, bringing the incidence of multiple births to 34 (5·3%).
§ Based on data quoted in text.
‖ χ^2 based on expectation of twins at birth in general population (2·4%). Yates's correction was used.

Comments

Clearly, the population of the Fountain Hospital and the Ellen Terry Home contains a proportion of twins significantly in excess of that in the general population, even if the figure for the latter at birth (2.4%) is used for comparison. That this excess of twins among mental

defectives is not confined to institutionalized populations is shown by the similarly raised incidence among defectives living at home. Studies in other countries, with only one exception so far as we are aware, have revealed a like pattern.

Thus, in Norway, Looft (1931) noted 4.6% of twins among 278 mental defectives compared with an incidence of twins at birth of 1.35% in the general population. More extensive later studies confirmed this trend. Juda (1939) found 2.41% of twins among 20,212 subjects in special schools, containing 80% mental defectives, in Bavaria, Baden, and Württemberg. This compared with an expectation of twins of 1.65% in the general population. Allen and Kallmann (1955) reported a 3.1% incidence of twins among institutionalized mental defectives in New York State as opposed to a 2% expectation in the general population. The excess of twins among the defectives was observed in all major diagnostic categories. Smith's (1930) finding was the exception; he noted 122 children of multiple births among 6,700 "mental defectives" in Denmark (1.82%), a figure not significantly higher than in the general population. However, Smith's material included subjects with intelligence quotients up to 90, and details of the method of collecting data are not given.

Most of the research on the intelligence of twins has been devoted to a comparison of like and unlike pairs with a view to assessing the relative importance of heredity and environment. Relatively little attention has been paid to the abilities of twins as such. Findings in such studies, however, have been complementary to those in our own and other series of an excess of twins among mental defectives. Thus, Mehrotra and Maxwell (1949), analysing data obtained by the Scottish Council for Research in Education (1949) (which contains information about 11-year-old children and includes data on twinning), found that the average intelligence-test score gave an intelligence quotient 5 points lower in twins than in non-twins. The difference could not be explained by differences in family size. The correlation between members of twin pairs on test scores was of the order of $r=0.7$.

Some relevant observations have also been made by Sandon (1957), who, in his capacity as chief examiner to two local education authorities, investigated the abilities of twins. Basing his study on candidates for the "eleven-plus" examination, he found that twins did markedly less well than ordinary children, having examination marks averaging some half to two-thirds of the standard deviation of the mark distribution less than those of ordinary children. He noted a significant shortage of twins in grammar schools.

A further contribution was made by Drillien (1959), whose material included 100 pairs of twins. She found that, on average, as tested on the Gesell scale, twins had consistently lower scores than other children. Her observations extended only up to the age of 2 years.

These findings, taken together, strongly suggest that twins tend to suffer from reduced potentialities for mental development. It is difficult to obtain adequate controlled data showing in what way, if any, the causes of mental retardation in twins differ from those in non-twins. An attempt will, however, be made to examine certain aspects of the problem.

Birth Weight

Table II shows that two-thirds (8 of 12) of the multiple-born patients in the Ellen Terry Home series had retrolental fibroplasia, as opposed to one-fifth (22 of 109) of the singletons ($P<0.002$). If all cases of retrolental fibroplasia are excluded, then the incidence of multiple births in this group of blind mental defectives falls from 9.9% (12 of 121) to 4.4% (4 of 91).

TABLE II.—121 *Consecutive Admissions of Blind Mental Defectives to Ellen Terry Home* (1948–58)

	Without Retrolental Fibroplasia	With Fibroplasia	Total
No. of singletons ..	87	22	109
,, ,, twins	3	7	10
,, ,, triplets	1	1	2
Total	91	30	121

Retrolental fibroplasia is associated with mental deficiency (Williams, 1958; Parmelee *et al.*, 1958) and almost invariably related to prematurity. It may be that the high incidence of twins in the group with retrolental fibroplasia is due to their low birth weights and their consequent liability to be submitted to oxygen therapy. However, as Williams (1958) points out, the same factors that damage the eyes may possibly be also responsible for brain damage.

Birth weights in various groups are shown in Table III.

TABLE III.—*Birth Weights in Various Groups*

Group	Total No. of Cases	Birth Weight (in lb.) 1½–	3½–	5½–	7½–	9½–	Mean Birth Wt. lb.	oz.	Premature* No.	%
General population of England and Wales (Ellis, 1947)							7	4		
Birmingham singletons (McKeown and Record, 1952)	22,454						7	7		
Birmingham twins (McKeown and Record, 1952) ..	650						5	4		
Birmingham single live births (Crosse, 1957)	87,203									6·1
Birmingham multiple live births (Crosse, 1957)	2,431									55·3
Singletons in F.H. (1953–7)	342	12	52	182	91	5	6	12	64	19
Twins in F.H. (1941–58)	44	10	24	10			4	11	34	77
Singletons in E.T.H. (1948–58) ..	79	18	12	33	16		5	12	30	38
Twins in E.T.H. (1948–58) ..	10	6	2	2			4	1	8	80
Singletons in E.T.H. without R.L.F. (1948–58) ..	62	4	10	33	15		6	6	14	23
Twins in E.T.H. without R.L.F. (1948–58)	3	1		2			5	7	1	33
Singletons in E.T.H. with R.L.F. (1948–58)	17	14	2		1		3	4	16	94
Twins in E.T.H. with R.L.F. (1948–58)	7	5	2				3	8	7	100

* Criterion for prematurity = birth weight of 5½ lb. or less.
F.H. = Fountain Hospital. E.T.H. = Ellen Terry Home. R.L.F. = Retrolental fibroplasia. For conversion to metric weights, 1 lb. = 454 g.

The birth weights quoted in Table III for the various groups in the Fountain Hospital and the Ellen Terry Home, with the exception of twins in the Fountain Hospital, are derived from all the relevant available birth weights of the 400 consecutive admissions to the Fountain Hospital (1953–7) and the 121 consecutive admissions to the Ellen Terry Home (1948–58) (see Table I). In order to obtain adequate data for twins in the Fountain Hospital, the available birth weights of all twins admitted to this hospital from 1941 to 1958 inclusive were considered.

It would appear that twinning is commoner among blind mental defectives than among those who are not blind (Table I), that the most important factor in this is retrolental fibroplasia (Table II), and that retrolental fibroplasia, both in singleton and in twin defectives, is associated with a lower birth weight than in twins generally and in sighted mentally defective twins (Table III). Our cases of retrolental fibroplasia show little difference between the mean birth weights of singletons (3 lb. 4 oz.; 1,474 g.) and twins (3 lb. 8 oz.; 1,587 g.). Forrester's (1955) findings were almost identical. In his series of cases of retrolental fibroplasia the average birth weight of the 28 single births was 3 lb. 2 oz. (1,417 g.) and of the 12 multiple births 3 lb. 4 oz. (1,474 g.). Both our figures and those of Forrester suggest that the critical birth weight below which retrolental fibroplasia is likely to occur tends to be slightly higher in multiple than in single births. If this is real it may be due to a greater tendency to nurse multiple-born than single-born children in an oxygen atmosphere.

Table III also shows that the mean birth weight of patients admitted to the Fountain Hospital—that is, gross mental defectives—is lower than that in general populations. In the case of twins there is a combination of this tendency with that for twins to be of low birth weight. The combined effect is that mentally defective twins have lower birth weights than either normal twins or single-born mental defectives. The incidence of prematurity (as judged on a birth weight of 5½ lb. (2,484 g.) or less) in singleton and twin mental defectives is also much higher than in single and multiple live births, respectively, drawn from the general community.

Vignes (1925) pointed out that the reduction in the birth weight of twins as against that of single births appeared to become greater with the lengthening of pregnancy; from which he concluded that the mothers had increasing difficulty in coping with the nutritional requirements of the twin foetuses. Douglas (1956) and Drillien (1958, 1959) have shown that children with low birth weights are, as a group, somewhat handicapped in regard to mental development. Further, Drillien and Richmond (1956) have shown that the incidence of low birth weight is related to social class. It would be interesting and informative to study twins in these contexts to see whether "upper class" twins are less liable to low birth weight and mental retardation than "lower class" ones.

Ovularity

In consecutive admissions of individual twins to the Fountain Hospital (1941–58) and the Ellen Terry Home (1948–58), the sex of the other member of the pair was known in 41 and 9 instances respectively. Detailed checking on ovularity in most of our cases was not possible. Of the nine pairs from the Ellen Terry Home series, only two were same-sex pairs, so that no more than 22% (two out of nine) of this series could have been uniovular. The 41 pairs from the Fountain Hospital series consisted of 29 same-sex and 12 opposite-sex pairs. An estimate of ovularity in these pairs can be arrived at with Weinberg's (1901) method, whereby the number of uniovular pairs is derived by deducting twice the number of opposite-sex pairs from the total number of pairs. On this basis, 17 ($41 - 2 \times 12$) of the 41 Fountain Hospital twins would be uniovular (41%). By comparison, the usual proportion of uniovular twins in European populations is 25–28% (Gates, 1946) and in the United States is 32.5% (Yerushalmy and Sheerar, 1940).

Yerushalmy and Sheerar (1940) found that the well-recognized excess stillbirth and neonatal mortality rate in twins (three times higher than in single births) appeared to be largely attributable to the uniovular pairs, which seemed to be more delicate or, as they put it, to have a "contitutional inferiority." The percentages of monozygotic and dizygotic twins in which both members of the pair were stillborn was 6.5 and 3.0 respectively. The neonatal mortality rate per 1,000 was 122 for all twins and 138.5 for monozygotic twins. This relative disadvantage of uniovular twins at birth and in the neonatal period might be expected to manifest itself in later life also, so that an undue proportion of mentally defective twins might be uniovular. In fact, as noted above, the proportion of uniovular twins in the Fountain Hospital series is rather high (41%). However, this figure must be interpreted cautiously, being based on an estimate in a comparatively small series. Further, no more than two out of the nine cases in the Ellen Terry Home series could have been uniovular. It would be worth while exploring this question in a larger series than at present available.

Yerushalmy and Sheerar noted that prematurity was 50% commoner in uniovular than in binovular twins, apparently using assessment of duration of pregnancy rather than birth weight as the criterion of prematurity. In our series of Fountain Hospital and Ellen Terry Home twins, birth weights were available in a total of 33 mental defectives of the same sex as the other twin and 19 defectives of opposite sex. These are analysed in Table IV. Differences between the same-sex and opposite-sex twins in mean birth weights and incidence of prematurity are in the anticipated direction, the same-sex cases (some of whom are uniovular) being lighter and more often premature.

TABLE IV.—*Birth Weights of 52 Mentally Defective Members of Twin Pairs According to Sex of Other Member (No. of Cases in Parentheses)*

	F.H. Series (42)		E.T.H. Series (10)		Total (52)	
	S.S. (30)	O.S. (12)	S.S. (3)	O.S. (7)	S.S. (33)	O.S. (19)
Mean birth weight	4 lb. 9 oz.	5 lb. 0 oz.	3 lb. 6 oz.	4 lb. 6 oz.	4 lb. 7 oz.	4 lb. 13 oz.
Incidence of prematurity	80% (24)	67% (8)	100% (3)	71% (5)	82% (27)	68% (13)

S.S. = Same sex. O.S. = Opposite sex. Criterion for prematurity = birth weight of 5½ lb. (2,484 g.) or less.

The Other Twin

In the consecutive admissions of individual twins to the Fountain Hospital and the Ellen Terry Home, referred to in the previous section, the fate of the other member of the pair was known in 40 and 9 instances respectively (Table V). The most striking finding is that none of the opposite-sex twins is mentally defective, while four of the same-sex twins are (three of imbecile level and one educationally subnormal). As any mono-

TABLE V.—*Fate of Other Member of 49 Twin Pairs Containing a Mentally Defective Member*

		F.H. Series		E.T.H. Series		Total	
		S.S.	O.S.	S.S.	O.S.	S.S.	O.S.
Deaths	Stillborn	3	2	0	0	3	2
	Within 3 days	3	1	0	1	3	2
	,, 4–8 months	2	1	0	2	2	3
Status of survivors	Mentally defective	3	0	1	0	4	0
	Normal	17	8	1	4	18	12
Total		28	12	2	7	30	19

S.S. = Same sex. O.S. = Opposite sex.

zygotic twins are included in the same-sex pairs, our finding is in accordance with expectation, twin studies showing a greater similarity between monozygotic siblings than between dizygotic (Böök, 1953).

It is also highly probable that some of the 18 normal same-sex survivors are monozygotic with the mentally defective member of the twin pair. Indeed, this is so in two pairs of twins in the present series, described in a separate publication (Brandon *et al.*, 1959). In these two pairs of monozygotic twins one member of each pair is microcephalic and a gross mental defective, the other being above average intelligence. In such cases birth injury can always be invoked as an explanation of the discrepancy in intelligence between the monozygotic twins, and this possibility cannot be eliminated in the two pairs of twins under consideration. However, this is not always an adequate explanation, and marked differences in intrauterine development occur, associated with factors like variations in vascular supply as discussed by Price (1950), so that by no means all monozygotic twins are concordant in regard to mental defect. If there was, in fact, identity of intrauterine environment in twins, then monozygotic twins should be truly identical at birth. Actually, fairly obvious differences are often found—for example, in birth weight (Vignes, 1925). In the above-mentioned two pairs of monozygotic twins the mentally defective member of each pair weighed 3 lb. 3 oz. (1,446 g.) and 4 lb. 10 oz. (2,098 g.) at birth, the birth weight of the normal member being 4 lb. 2 oz. (1,871 g.) and 7 lb. (3,175 g.) respectively.

Birth weights of both members (of which one was mentally defective and the other normal) were available in a total of 27 twin pairs from the Fountain Hospital and Ellen Terry Home series. These have been analysed in terms of same-sex and opposite-sex pairs in Table VI. It shows a tendency for the normal twins to have higher birth weights than the defective twins, both in the same-sex and in the opposite-sex pairs. The differences are, however, not statistically significant in this series.

Birth Order

Excluding the four instances where both members of the twin pair were mentally defective (see Table V), the order of birth of our mentally defective individual twins was known in 30 and 6 cases of the Fountain Hospital and the Ellen Terry Home series respectively. The birth order of the other members of each pair, in terms of their fate, has been analysed in Table VII. This indicates that a total of 61% (22 of 36) of our *mentally defective twins* were second-born. Further, 57% (8 of 14) of the other members of each pair that were second-born were stillbirths or died within eight months, as opposed to 36% (8 of 22) that were first-born. To put the latter data in another way, 43% (6 of 14) of the other members of each pair that were second-born were normal survivors, compared with 64% (14 of 22) of those that were first-born. While these figures are too small to be significant, our findings are similar to those of Yerushalmy and Sheerar (1940). They noted that second-born twins were at a disadvantage and tended more often to be stillborn. They found, however, no significant difference in neonatal mortality rates between first- and second-born twins.

Aetiological Factors

In Table VIII aetiological factors for mental deficiency detected among all (46) consecutive admissions of members of a twin pair to the Fountain Hospital from 1941 to 1958 inclusive have been set out alongside similar data derived from 100 consecutive admissions

TABLE VIII.—*Aetiological Factors in Consecutive Admissions to Fountain Hospital of* 46 *Individual Twins* (1941–58) *and* 100 *Singletons* (1956–7)

Groups			Twin Series	Singleton Series
Group A (associated with known cause or distinct syndrome):				
Environmental	Meningitis	Tuberculous	—	2
		Influenzal	—	1
		Pneumococcal	1	—
	Kernicterus	Due to rhesus-factor incompatibility	1	2
		Of prematurity	—	1
	Pertussis immunization		—	1
Genetic	Phenylketonuria		1	—
	Cerebral lipoidosis		—	2
	Galactosaemia		—	1
Uncertain	Mongolism		2	24
	Sturge–Weber syndrome		—	1
Group B (probably due to cause indicated):				
Environmental	Encephalitis		1	1
	Septicaemia with coma		—	2
	Gastro-enteritis with coma		—	1
	Maternal rubella		—	1
Group C (other possibly significant factors):				
Environmental: ? Cerebral trauma or anoxia at birth*			9	11
? Genetic	†Family history of mental retardation		11	11
	† ,, ,, ,, psychosis		2	3
Group D (none of above suggested)			18	35
Total No. of cases			46	100

* Associated with severe cyanosis, irritation, collapse, or convulsions.
† Family = Grandparents, parents, siblings, uncles, aunts, and first cousins.

TABLE VI.—*Mean Birth Weights of* 27 *Twin Pairs, Each Pair Containing One Defective and One Normal Member*

	Fountain Hospital Series			Ellen Terry Home Series			Combined Series		
	Defective Twin	Normal Twin	No. of Cases	Defective Twin	Normal Twin	No. of Cases	Defective Twin	Normal Twin	No. of Cases
Same-sex pairs ..	5 lb. 3 oz.	5 lb. 11 oz.	14	3 lb. 4 oz.	3 lb. 1 oz.	1	5 lb. 1 oz.	5 lb. 8 oz.	15
Opposite-sex ,, ..	5 ,, 6 ,,	5 ,, 8 ,,	8	5 ,, 2 ,,	5 ,, 5 ,,	4	5 ,, 4 ,,	5 ,, 7 ,,	12

TABLE VII.—*Birth Order and Fate of* 36 *Other Members of Twin Pairs, Each of Which Contains One Mentally Defective Member*

	Totals			Stillbirths			Deaths Within 3 Days			Deaths Within 4–8 Months			Normal Survivors		
	F.H.	E.T.H.	Total	F.H.	E.T.H.	Total	F.H.	E.T.H.	Total	F.H.	E.T.H.	Total	F.H.	E.T.H.	Total
Other twin born first ..	18	4	22	3	0	3	2	1	3	1	1	2	12	2	14
,, ,, ,, second ..	12	2	14	4	0	4	1	0	1	2	1	3	5	1	6
Total	30	6	36	7	0	7	3	1	4	3	2	5	17	3	20

of singletons to the same hospital from March 29, 1956, to November 21, 1957. Nearly all cases in both the twin and the singleton series were gross mental defectives (idiots or imbeciles), an occasional child being educationally subnormal. Owing to the small numbers, any comparison between the two groups in terms of causation of mental defect is of limited value. The most striking difference is in the percentage incidence of mongolism—six times commoner in the singleton than in the twin series. Both series reflect the difficulty of establishing causes of severe mental defect, a problem which we have discussed elsewhere (Berg and Kirman, 1959).

Clinical Findings

A comparison of clinical findings, as distinct from aetiological factors, was also made between consecutive admissions to the Fountain Hospital of 44 individual twins (1941–58) and 100 singletons (October 5, 1955, to November 21, 1957) (Table IX). In this instance, in order to make the two groups more comparable in respect of physical signs, cases of mongolism were excluded because of the high incidence of these among admissions of singletons only (Table VIII).

TABLE IX.—*Clinical Findings in Consecutive Admissions to Fountain Hospital of* 44 *Individual Twins* (1941–58) *and* 100 *Singletons* (1955–7) (*Cases of Mongolism Excluded*)

Finding	Twin Series	Singleton Series
Skull	*15 (34%)*	*24*
Microcephaly*	14	21
Hydrocephalus	1	3
Eyes	*21 (48%)*	*46*
Strabismus	12	40
Blindness	10	11
Optic atrophy	6	8
Retrolental fibroplasia	4	1
Nystagmus	4	17
Microphthalmia	3	0
Coloboma	1	1
Cataract	0	1
Buphthalmia	0	1
Interstitial keratitis	0	1
Epilepsy†	*16 (36%)*	*23*
Cerebral palsy	*14 (32%)*	*41*
Spastic diplegia	8	23
Hemiplegia	4	8
Athetosis	2	5
Ataxia	0	5
Other physical anomalies	*6 (14%)*	*14*
Inguinal hernia	2	1
Cleft palate	1	3
Congenital heart defect	1	1
Imperforate external auditory meatus	1	0
Prolapsed rectum	1	0
Deformed feet	0	3
Polydactyly	0	2
Congenital dislocation of hips	0	1
Recto-vulval fistula	0	1
Pyloric stenosis	0	1
Hiatus hernia	0	1
Psychotic	*2 (5%)*	*2*
None of above clinical findings	*6 (14%)*	*20*

* Defined as a head circumference of more than three standard deviations below Westropp and Barber's (1956) mean for that particular age and sex.
† Fits observed in Fountain Hospital only.

The frequency of physical abnormalities is notable, over three-quarters of the patients in each series having one or more of the findings listed. Differences in incidence of individual clinical findings between the two groups are not statistically significant in our comparatively small series when examined, where applicable, by the χ^2 test ($P>0.1$).

Necropsy Findings

Necropsy reports were available on the brains of nine patients in the Fountain Hospital twin series who died after admission at ages ranging from 2 to 15 years.

Eight of the brains weighed 116 to 930 g. (mean, 387 g.) less than the average for the age, using the norms of Coppoletta and Wolbach (1933). The ninth weighed 149 g. more than the norm, due to terminal congestion and oedema. None showed gross malformation such as would indicate origin in embryonic life, though all nine had pathological changes. These changes were consistent with damage occurring in the latter part of pregnancy, at birth, or post-natally (ulegyria, loss of white matter with thinning of the corpus callosum, ventricular dilatation, or marbling of the striatum). It was not found possible to time the origin of the lesions more precisely on the basis of the pathology alone, though clinical evidence suggested origin at birth in two cases and post-natally in one.

Summary

Twins admitted to the Fountain Hospital and the Ellen Terry Home were studied. Both admit grossly defective children (idiots and imbeciles), the latter institution blind ones only and the former without bias in favour of blindness.

Incidence.—The proportion of twins among both institutionalized mental defectives and those living at home exceeded significantly that in the general population. The greater incidence of twins in the Ellen Terry Home, as opposed to that in the Fountain Hospital, was directly related to the comparative frequency of retrolental fibroplasia in the former institution.

Birth Weight.—The mean birth weight of gross mental defectives was lower than that in general populations. In twins this tendency was combined with that for twins to have low birth weights. The combined effect was that mentally defective twins had lower birth weights than either normal twins or single-born mental defectives. Prematurity, judged on a birth weight of 5½ lb. (2,484 g.) or less, in singleton and twin defectives was commoner than in single and multiple live births, respectively, drawn from the general community. Retrolental fibroplasia, both in singleton and in twin defectives, was associated with a lower birth weight than in twins generally and in sighted defective twins. The mean birth weight of the cases with retrolental fibroplasia in the Ellen Terry Home series was slightly lower in singletons than in twins.

Ovularity.—An estimated 41% (17 of 41) of defective twins admitted to the Fountain Hospital were uniovular. No more than 22% (2 of 9) admitted to the Ellen Terry Home could have been uniovular. Defective twins of the same sex as the other member of the pair had a lower mean birth weight and higher incidence of prematurity (5½ lb.—2,484 g.—or less at birth) than defective twins of opposite sex to the other member.

The Other Twin.—In a total of four twin pairs concordant for mental defect, all four were same-sex pairs. In another two twin pairs in whom monozygosity was established, one of each pair was a gross defective, the other being above average intelligence. In twin pairs containing one normal and one defective member, the former tended to have higher birth weights both in same-sex and in opposite-sex pairs.

Birth Order.—Second-born twins tended to be at a disadvantage in regard to the chances of both mental defect and early death. 61% (22 of 36) of our defective twins were second-born. 57% (8 of 14) of the other members of the pairs that were second-born were still-

births or died in early infancy, compared with 36% (8 of 22) who were first-born.

Aetiological Factors.—In consecutive admissions to the Fountain Hospital of 46 individual twins and 100 singletons, the most striking difference was in the percentage incidence of mongolism—six times commoner in the singleton than in the twin series.

Clinical Findings.—In consecutive admissions to the Fountain Hospital of 44 individual twins and 100 singletons (mongolism excluded) over three-quarters of the patients in each series had physical abnormalities. Differences in incidence of individual clinical findings between the two groups were not statistically significant.

Necropsy Findings.—In nine of the Fountain Hospital twin series who had died since admission, none of the brains showed gross malformation suggesting origin in embryonic life, though all nine had pathological changes. The origin of these changes could not be timed precisely, though all were consistent with damage late in pregnancy, at birth, or post-natally.

We are indebted to Dr. C. W. J. Ingham for permission to examine the records of mental defectives under statutory supervision in several London Boroughs; to Miss M. P. Docherty for putting the records at our disposal; to Dr. C. E. Williams, Dr. B. F. Green, and Miss M. F. Craib for assistance in collecting clinical data; to Mrs. M. W. G. Brandon for help with statistical calculations; to Dr. L. Crome and Dr. P. E. Sylvester for necropsy reports; and to Dr. Valerie Cowie, Dr. Jack Tizard, and Mr. James Shields, as well as our colleagues at the Fountain Hospital, for helpful comments.

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A STUDY OF THE AETIOLOGY OF RESPIRATORY DISEASE IN A GENERAL HOSPITAL

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The main objects of this investigation were to determine (1) the prevalence of viral and bacterial infections in *all* patients admitted to hospital suffering from a respiratory illness, their clinical picture, and the effect of admission to hospital on the course of the illness; and (2) the number and cause of acute respiratory illnesses arising in patients already in hospital suffering from some other disease.

Materials and Methods

The survey covered the period September 29, 1958, to March 31, 1959, and comprised 117 children and 179 adults. The following were included: (1) *All* patients with symptoms of respiratory disease admitted to all the adult medical wards of St. Thomas's Hospital; (2) all children with symptoms of respiratory disease admitted to the medical children's ward at St. Thomas's Hospital and the children's ward of the Royal Waterloo Hospital; (3) patients developing symptoms of respiratory disease while in these wards. These were ascertained by daily visits to each ward by one of us.

All patients were seen and examined by one of us within 24 hours of admission. The history and results of physical examination were recorded on a standard form, which also included the results of *x*-ray examination. Patients were re-examined at intervals, usually of two to three days, throughout their stay in hospital. Serological results were regarded as significant only when there was a fourfold or greater rise between suitably paired specimens. Results are expressed as statistically significant only when $P \leqslant 0.05$.

Specimens Examined.—At the first examination 5–10 ml. of venous blood was taken from all patients. A further specimen was obtained 10 to 28 days later from as many patients as possible. Serum was separated immediately from all samples and stored at −20° C. Throat swabs for virus isolation were taken from all children at the first examination, and from adults with symptoms of less than five days' duration before admission. Swabs were broken off into bijou bottles containing 2 ml. of Hanks's solution with 0.5% lactalbumin hydrolysate and placed immediately in a vacuum flask

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containing solid carbon dioxide for transport to the laboratory. Nose and throat swabs for bacteriological examination were taken by the nurses immediately after admission and placed in test-tubes containing blood-agar. These swabs were plated out within 36 hours of being taken. Samples of sputum were obtained from all adult patients producing phlegm.

Follow-up Specimens.—Nose and throat swabs were taken at intervals of two to four days from all children in St. Thomas's Hospital who remained in the ward for more than three days, and from adults for the first two weeks of their stay, or until discharged, whichever was the shorter, providing there was no history of chronic bronchitis. Further samples of sputum were also obtained from patients developing pneumonic complications. In addition, specimens were obtained for virus and bacteriological examination from any patient in the survey on whom a necropsy was performed.

Control Nose and Throat Swabs.—Nose and throat swabs were obtained in a similar manner from medical and surgical patients admitted without respiratory symptoms in the period January 1, 1959, to March 31, 1959. As too few babies without respiratory symptoms were admitted to hospital to produce the same number of controls, the majority of "control" swabs for children of less than 1 year were obtained from normal babies attending a child-welfare clinic at the hospital.

Virus Isolation.—Specimens: throat swabs in Hanks's solution were inoculated in 0.1-ml. amounts into duplicate tubes of HeLa cells, monkey-kidney cells, and human amnion cells. *HeLa cells* were grown and maintained as described by Pereira and Kelly (1957) and examined for cytopathic change on alternate days for a period of 28 days. *Monkey-kidney cells* were grown as described by Pereira (1958). Tubes were examined on alternate days for any cytopathic effect and tested for haemadsorption on the fifth and tenth days of incubation by the methods used by Chanock *et al.* (1958) for the isolation and identification of viruses. *Human amnion cells* were prepared and maintained as described by Lane and Marshall (1957).

Adenoviruses were identified by complement-fixation followed by serum neutralization with type-specific rabbit antisera; Coxsackie B and Echo viruses by serum neutralization; parainfluenza viruses by serum neutralization. The isolation of influenza virus in fertile hens' eggs was not in general attempted except from lungs from fatal cases, as it was realized that as a cause of respiratory infection it would be revealed by the complement-fixation tests on paired sera.

Serology.—Complement-fixation tests, except those for the parainfluenza group of viruses, were carried out in plastic haemagglutination plates (World Health Organization, 1953), using volumes of 0.1 ml. (Holland *et al.*, 1960). Specimens of serum taken at the convalescent stage were first screened at a dilution of 1/10 against: influenza viruses A, B, and C; Sendai virus; psittacosis virus; adenovirus; and *Rickettsia burnetii.* Titrations of paired sera were carried out as indicated by the screening tests. Complement-fixation tests for the parainfluenza group of viruses were done, using the method described by Pereira (1956) with monkey-kidney-tissue-culture fluid as antigens. *Serum neutralization tests* were used to detect the presence of antibodies to Coe virus (Pereira and Pereira, 1959). *Agglutination tests* for antibodies to *Streptococcus* M.G. were carried out also (Thomas *et al.*, 1945).

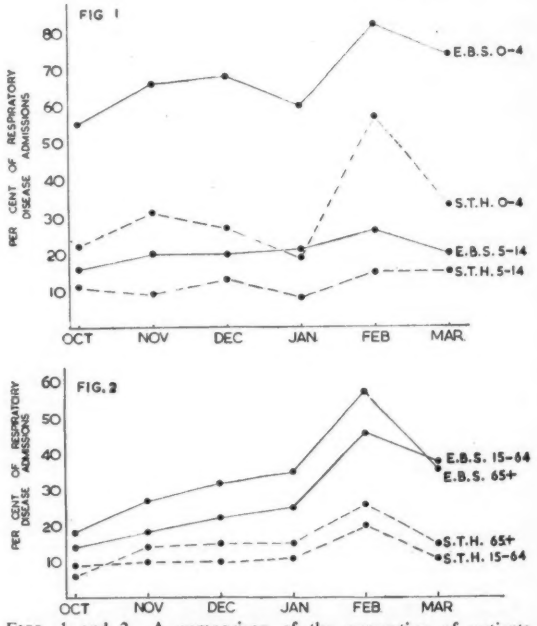
Bacteriological Methods.—Specimens of sputum and nose and throat swabs were cultured on blood-agar and heated blood-agar. All strains of *Staphylococcus aureus* isolated were tested for their sensitivity to penicillin, streptomycin, chloramphenicol, tetracycline, erythromycin, and novobiocin by the ditch-plate method (Barber *et al.*, 1958) and phage-typed by Dr. Patricia Jevons at the Central Public Health Laboratory, Colindale.

Results

Number of Samples Available for Testing.—From patients aged 1 year and over, 91–94% of satisfactory samples of paired sera were obtained for testing. From those aged less than 1 year we could get only 75% of satisfactory pairs of sera owing to the difficulty in obtaining sufficient blood. There was usually a longer interval between the onset of symptoms and admission to hospital in adults, which accounted for the lower proportion of throat swabs for virus isolation taken then.

Prevalence of Respiratory Illnesses.—Figs. 1 and 2 show the proportion of patients in each age-group who were admitted to St. Thomas's Hospital because they were suffering from respiratory disease, compared with those, over a similar period, arranged by the Emergency Bed Service (E.B.S.) in London. Table I shows the actual number of patients with respiratory disease during this period. It should be noted that the E.B.S. figures are classified as total respiratory disease—that is, they include such cases as carcinoma of the bronchus—whereas the St. Thomas's Hospital cases are only those with an acute respiratory illness.

Clinical Diagnosis.—Table II represents the clinical diagnoses made by one of us as a result of physical and radiological examination in conjunction with the opinion of the physicians in charge of the patients. It also shows the number of deaths that occurred in each group.



FIGS. 1 and 2.—A comparison of the proportion of patients admitted with acute respiratory disease to St. Thomas's Hospital (S.T.H.) with those admitted by the Emergency Bed Service (E.B.S.) over the period October, 1958, to March, 1959, in the different age-groups.

TABLE I.—*Age Distribution of Patients with Respiratory Diseases Admitted to St. Thomas's Hospital (S.T.H.) or by the Emergency Bed Service (E.B.S.) in the Period October, 1958, to March, 1959*

	Age in Years									
	<1		1–4		5–14		15–64		65+	
	E.B.S.	S.T.H.	E.B.S.	S.T.H.	E.B.S.	S.T.H.	E.B.S.	S.T.H.	E.B.S.	S.T.H.
October ..	45	4	58	4	63	6	321	17	221	3
November	66	2	85	13	74	5	440	20	393	6
December	109	6	112	4	74	7	570	18	594	9
January ..	160	4	136	5	88	4	722	19	747	9
February	284	12	265	15	120	5	1,695	39	1,578	12
March ..	151	8	162	7	75	6	639	21	640	6
Total ..	815	36	818	48	494	33	4,387	134	4,173	45

TABLE II.—*Clinical Diagnoses Made in Each Age-group of Patients Admitted During the Survey*

	Age-group									
	0–11 Months		1–4 Years		5–14 Years		15–64 Years		65+ Years	
	No.	%	No.	%	No.	%	No.	%	No.	%
Acute infections of upper respiratory tract	11	31	19	40	22	67	24	18	0	
Bronchitis ..	14	39	14	29	2	6	26	19	15	33
Localized pneumonia ..	6	17	3	6	5	15	33 (2)	25	10	22
Diffuse pneumonia	3	8	12	25	4	12	32 (6)	24	11	24
Cor pulmonale ..	0		0		0		19 (2)	14	9 (2)	20
Bronchiolitis ..	2	6	0		0		0		0	

Figures in parentheses represent number of deaths.

Evidence for Virus Infection in Patients Admitted

The seasonal distribution of the different viruses isolated is shown in Fig. 3. Table III illustrates the relation of the various clinical diagnoses and evidence of virus infection. The clinical diagnoses were divided into three main groups, as shown in this table, because no helpful differentiation in aetiological diagnosis could be made by further subdivision. A diagnosis of virus infection was made more often in the children than in the adults admitted, and in infections of the upper respiratory tract than in the lower respiratory tract. Of 33 babies aged less than 1 year from whom satisfactory samples were available for testing only 4 (12%) had evidence of virus infection. This is in contrast to the evidence of virus infection in 22 (45%) children aged 1 to 4 years, 9 (29%) children aged 5 to 14 years, and 38 (21%) patients aged more than 15 years.

Influenza A, B, and C Viruses.—Three strains of influenza A virus, all of the Asian variety, were isolated, and serological evidence of infection was obtained in 28 patients. Four strains of influenza B virus were isolated and serological evidence of infection was obtained in 12 patients, one of whom also had evidence of infection with influenza C. These infections were found in all age-groups.

Parainfluenza Viruses.—Three strains of parainfluenza 1 virus were isolated in children aged 1 to 14 years. Five further patients, including two adults and one baby aged less than 1 year, had serological evidence of parainfluenza virus infection—three with parainfluenza 3 virus and two with parainfluenza 1 virus. There was no evidence of infection with parainfluenza 2 virus.

Adenoviruses.—Two strains of adenovirus type 1, one strain of adenovirus type 2, one strain of adenovirus

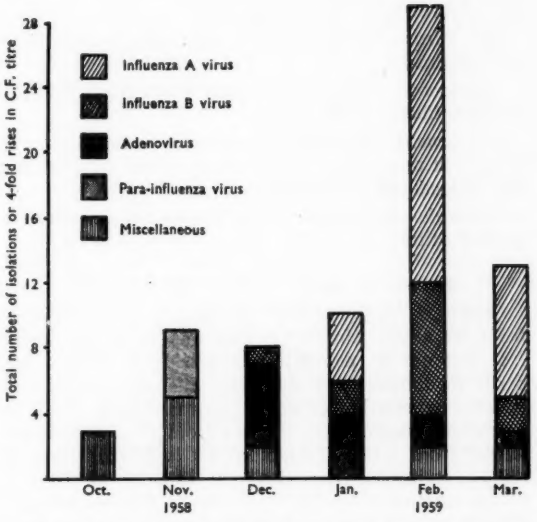


FIG. 3.—Distribution of respiratory virus infections during the period October, 1958, to March, 1959, diagnosed by isolation or fourfold rise in complement-fixing antibody titre.

TABLE III.—*Clinical Diagnosis and Evidence for Virus Infection in Patients Admitted to Hospital*

	Infection of Upper Respiratory Tract				Bronchitis; Bronchiolitis; Cor pulmonale				Localized and Diffuse Pneumonia				Total
	0–14 Years		15+ Years		0–14 Years		15+ Years		0–14 Years		15+ Years		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Total No. of patients	52		24		32		69		33		86		296
No. of paired sera	46	89	23	96	28	85	59	86	28	85	70	81	254
,, ,, throat swabs tested for viruses	47	90	22	92	32	100	49	71	32	97	52	60	234
Influenza virus A, B, and C ..	5	11	9	39	7*	25	9	15	2	7	10	14	42
Parainfluenza viruses	4	9	0		0		0		2	7	2	3	8
Adenoviruses	3	7	0		3	11	0		0		2†	3	8
Psittacosis virus, Echo virus. Coxsackie virus. *R. burnetii*	4	9	2	9	1	4	0		0		1	2	8
Unidentified cytopathic agents	2	4	0		0		0		0		0		2
Streptococcus M.G.	0		0		0		0		0		1†	2	1
Glandular fever	0		4	17	0		0		0		0		4
Total No. of positive isolations or fourfold rises in antibody titre	18	40	15	65	11	40	9	15	4	14	16	24	73

* One patient had a fourfold rise in antibody titre to both influenza virus B and C.
† One patient had a fourfold rise in antibody titre to both adenovirus and *Streptococcus* M.G.
The percentages in the table are percentages of satisfactory specimens tested.

type 3, and one strain of adenovirus type 5 were isolated. All these were isolated from children except the type 2 strain, which came from a man aged 64. Serological evidence of adenovirus infection was obtained in three additional patients. In some of these a fourfold rise in agglutination titre to *Streptococcus* M.G. was observed.

Psittacosis Virus.—Serological evidence of infection was present in one patient, a vagrant, who habitually slept on the Thames Embankment, in the company of pigeons.

Coxsackie B Virus.—Three strains of Coxsackie B4 virus and one strain of Coxsackie B3 virus were isolated. None of these patients had an increase in antibody titre. One strain of Coxsackie B4 virus was isolated from the lesions of a woman, aged 50, with herpetiform stomatitis.

Echo Type 3 Virus.—Two strains were isolated in children, both of whom showed a fourfold rise in antibodies to this agent.

Unidentified Cytopathic Agents.—Two strains of an unidentifiable cytopathic agent were isolated in HeLa cell cultures from two children.

Coe Virus.—No evidence of infection by this virus was obtained.

Streptococcus M.G.—One patient showed a fourfold rise in antibody to this agent.

R. burnetii.—Serological evidence of infection was present in one patient who lived in South London and had a localized pneumonia.

Glandular Fever.—Four adults had a rise in heterophil antibody titre.

Presence of Bacteria in Sputum on Admission

Only 127 (71%) samples of sputum were examined from the adults admitted. This was partly due to the fact that not all patients were producing phlegm and partly to difficulties in obtaining satisfactory specimens in some patients before treatment was started. *Streptococcus pneumoniae* was isolated from 45 (36%), *Staph. aureus* from 3 (2%), *Haemophilus influenzae* from 28 (22%), coliforms from 9 (7%), *Proteus* sp. from 3 (2%), and in 54 (42%) all these above-mentioned organisms were absent. It is not known if any of these organisms was the primary cause of the illness. The relationship with virus infection is shown below.

From 33 (77%) of 43 cases of localized (lobar) pneumonia in adults, sputum was obtained for testing. *Str. pneumoniae* only was isolated from the sputum of 11 (33%); no evidence of virus infection was present in any of these patients. Of 19 (58%) from whom no pathogens were isolated from the sputum, four showed evidence of virus infection. *Staph. aureus* was isolated from the sputum of one patient (she did not, clinically, have a staphylococcal pneumonia), and *Proteus* sp. was isolated from the sputum of another patient who had a long history of chronic bronchitis. One patient with a localized pneumonia had evidence of a primary tuberculous infection. Of 43 cases with diffuse pneumonia, sputum was tested in 35. *Str. pneumoniae* only was grown in 7 (20%); two of these also had evidence of influenza A virus infection. The sputum from seven contained *H. influenzae* and *Str. pneumoniae*, and sputum from two contained a mixture of coliforms and *Str. pneumoniae*. From three patients *H. influenzae* only was grown, from one patient coliforms only, and from another *Staph. aureus*. No pathogens were grown in 14 patients (40%). The relationship of bacterial flora in the nasopharynx to the cause of illness is discussed below.

Comparison of Aetiology of Acute and Chronic Illnesses

The respiratory illnesses of 105 of the children admitted could be regarded as acute; in three the respiratory-tract symptoms were probably due to cardiac failure complicating congenital heart disease, three were secondary to leukaemia, and six had a long history of asthma.

Among the adults admitted to hospital the illnesses of 87 could be regarded as primarily respiratory and not precipitated by any other condition, and 92 illnesses were secondary to an underlying abnormality. Of the latter patients, 12 suffered from heart disease (rheumatic or hypertensive) and were admitted with cardiac failure as well as illnesses of the respiratory tract, 7 had leukaemia or generalized sarcoidosis, 13 had a history of asthma, and 60 showed evidence of chronic bronchitis and emphysema.

Evidence of virus infection was obtained more commonly in children and adults admitted with an acute illness (33%) than in those with a "chronic" illness (18%).

Relationship of Sputum Findings to Evidence of Virus Infection

There was no relation between the isolation of various pathogens from the sputum and evidence of virus infection in patients admitted with a respiratory illness. This is also borne out by Fig. 4, which shows the seasonal

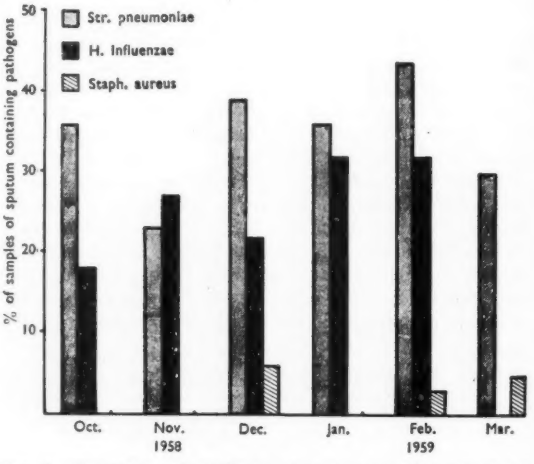


FIG. 4.—Percentage of specimens of sputum containing bacterial pathogens in the period October, 1958, to March, 1959.

distribution of *Str. pneumoniae*, *H. influenzae*, and *Staph. aureus* in the sputum; the seasonal incidence of these bacteria in sputum has not varied, or has followed the pattern of virus infections shown in Fig. 3.

Importance of Nasopharyngeal Flora

No association between any one virus and the presence of a particular kind of organism or combination of organisms in the nasopharynx was found. There was also little seasonal variation in the isolation of bacteria from the nasopharynx (Fig. 5). There was, however, a considerable difference in the rates of isolation of *H. influenzae*; both in adults and in children a signi-

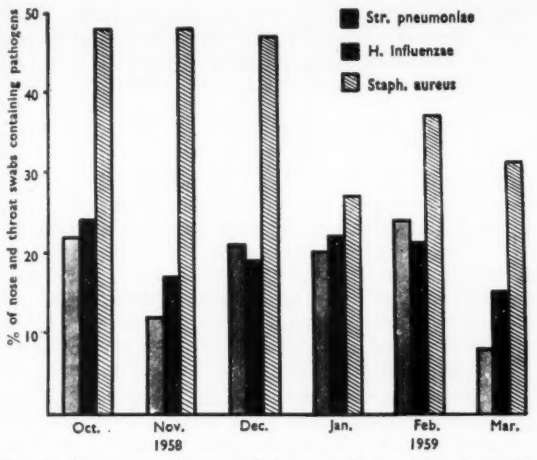


FIG. 5.—Percentage of nose and throat swabs containing bacterial pathogens in the period October, 1958, to March, 1959.

ficantly greater proportion of patients with infections of the lower respiratory tract had strains of *H. influenzae* present in the nasopharynx (Table IV).

TABLE IV.—*Incidence of Pathogens in Nasopharynx on Admission of Patients With and Without Respiratory Infection*

	0–14 Years						15+ Years					
	Upper Respiratory Tract		Lower Respiratory Tract		Controls		Upper Respiratory Tract		Lower Respiratory Tract		Controls	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total No. of patients ..	82		35		163		66		113		191	
No. of nose and throat swabs taken	77	94	34	97	163		62	94	108	95	191	
Str. pneumoniae ..	15	19	7	21	29	18	8	13	21	19	20	10
Str. pyogenes	11	14	2	6	19	12	1	2	3	3	1	0·5
Staph. aureus	34	44	14	41	85	52	23	37	37	34	71	37
H. influenzae	16	21	13	38	21	13	5	8	21	19	22	12
Coliforms ..	18	23	2	6	30	18	6	10	22	20	19	10
Proteus sp. ..	1	1	2	6	7	4	5	8	10	9	10	5
None of above	5	6	4	12	33	20	21	34	30	28	71	37

Fatal and Other Complications in Patients Admitted to Hospital With Respiratory Illness

No deaths occurred among the children in the study. In two a staphylococcal pneumonia developed after admission; from one of these a strain of *Staph. aureus* resistant to penicillin and tetracycline was isolated, though no such strain had been found in the nasopharynx on admission. From the other child the same phage type of *Staph. aureus* was isolated at the time of the pneumonia as was isolated from the nasopharynx on admission.

Among the adults 12 deaths occurred. Post-mortem examinations were performed on six of these, and material from five was available for virological and bacteriological examination. One influenza virus A (Asian) and one influenza virus B strain was isolated from these. *Str. pneumoniae* was isolated from one patient, and staphylococci from three. In these three patients the strain of *Staph. aureus* isolated at post-mortem examination was either not present in the sputum or nasopharynx on admission or was of a different phage type. These three strains were resistant to three or more antibiotics, as were the majority of the "acquired" strains (see below).

In five adult patients a staphylococcal pneumonia developed after admission. In all cases the strain isolated from the sputum was of a different type from that present in the nasopharynx or sputum on admission and was resistant to three or more antibiotics.

Acquisition of Staph. aureus by Patients with Respiratory Illnesses

Nose and throat swabs were taken at intervals of two to three days from 62 (53%) of the children and 103 (61%) of the adults. The children were followed for an average of six days, the adults for nine days; this reflects the duration of stay in hospital. Six of the children

TABLE V.—*Sensitivity Characteristics of Staph. aureus in Nasopharynx of Patients Admitted with Respiratory Disease, Including Strains Isolated at Necropsy*

	Staph. aureus Isolated on Admission		*Staph. aureus* Acquired in Hospital	
	No.	%	No.	%
Total No. of strains ..	109		51	
Sensitive to all antibiotics	52	48	7	14
Resistant to penicillin ..	53	49	43	84
,, ,, streptomycin	16	15	23	45
,, ,, one or more of: tetracycline, chloramphenicol, erythromycin, novobiocin	23	21	42	82
Not known	2	2	0	

(10%) and 17 of the adults (17%) retained the same phage type throughout their stay. Thirteen of the children (21%) and 11 of the adults (11%) lost the original strain without acquiring a new phage type. Fifteen of the children (24%) and 32 of the adults (32%) acquired a new strain of staphylococcus in the nasopharynx. 28 children (45%) and 43 adults (42%) did not acquire a strain of *Staph. aureus* throughout their stay. The pattern of antibiotic sensitivity of strains isolated on admission compared with that of strains acquired in hospital is shown in Table V: it may be seen that those acquired were usually resistant to more than one antibiotic.

Analysis of the figures concerning bacteria acquired in the nasopharynx by patients with evidence of virus disease and those without did not reveal any significant difference.

Respiratory Infections Arising in Patients Already in Hospital

Post-operative Respiratory Illnesses.—345 operations under general anaesthesia were performed in the six adult medical wards and 39 in the one children's ward at St. Thomas's Hospital. Eight adults and one child developed fever of 99° F. (37.2° C.) or over, lasting more than 24 hours, with symptoms of respiratory tract involvement within one week of operation. No evidence of virus infection was found in any of these patients. *Str. pneumoniae, Staph. aureus, H. influenzae,* and coliforms were isolated from the sputum of five of the adults. *Str. pyogenes* was isolated from the throat swab of the child.

Other Patients Developing Respiratory Illnesses.—Five adults and three children developed a respiratory illness while in hospital with some other disease. No evidence of virus infection was obtained in any of the adults, nor were samples of sputum examined before antibiotics were administered. In one child with hypercalcaemia a strain of adenovirus type 2 was isolated from

a throat swab, and there was a fourfold rise in complement-fixing antibody titre to adenovirus. Parainfluenza type 1 virus was isolated from the throat swab of one other child. From the third, a boy with fibrocystic disease of the pancreas, no virus was isolated, but moniliae were grown from the sputum; he died, but necropsy was not performed.

Discussion

This study confirms the importance of infections of the respiratory tract as a cause of admission to hospital. The seasonal pattern during the period of the survey showed a slow rise in adult admissions, with a peak in February; a similar picture was seen in the children, but in these a rise had already occurred in November. The peak in the second half of the period was due to influenza A and B viruses.

It was hoped that this investigation might reveal an association between particular clinical syndromes and different aetiological agents. This aim was not realized. Evidence of virus infection was found more often in patients with an acute disease of the respiratory tract than in those in whom the acute infection was complicating some pre-existing respiratory disease. Evidence of virus infection was obtained also much more commonly in patients with disease of the upper respiratory tract than with that of the lower, and in children as compared with adults. It is possible that both these findings are related to the time interval between onset of the illness and admission to hospital, since children come to hospital much earlier than adults.

The results suggest that 28% of the illnesses in children and 22% in adults were caused by an identifiable virus. In the period studied 12% of illnesses in children and 16% of illnesses in adults were due to influenza A and B viruses. Thus, despite the identification of a large number of viruses capable of causing acute respiratory illness in recent years, the majority of illnesses remain unidentified. A certain proportion may, of course, have been streptococcal sore throat and pneumococcal pneumonias, but, according to the figures presented, this would account for only about another 5% of illnesses.

A striking finding was the relative paucity of evidence for the cause of infection in babies aged 0–11 months. No explanation for this is available, as similar methods were used in all groups. This finding is very different from the investigation of respiratory illnesses in babies undertaken in Washington, D.C., where isolation rates for parainfluenza viruses 1 and 3 were highest in the 0–1 age group (B. E. Andrews, 1959, personal communication; Parrott *et al.*, 1959).

It is difficult to compare our results with those of other workers in view of the differences in the populations studied and in the methods used. Crofton *et al.* (1951) obtained serological evidence of virus or rickettsial infection in 26 out of 110 cases of pneumonia, and pneumococci were isolated from the sputum in 29 (26%) of them. These results were similar to those obtained in our investigation of all respiratory illnesses. Evans (1957) was able to make an aetiological diagnosis in 18% of 710 Wisconsin students admitted to hospital, and Grieble *et al.* (1958) made an aetiological diagnosis in 29 out of 122 adults with acute respiratory infections seen at a clinic, but not needing admission to hospital.

In the development of complications of disease of the respiratory tract, the danger of acquiring a highly resistant strain of *Staph. aureus* was evident. It appears that patients without disease of the respiratory tract rarely develop a respiratory infection while in hospital, and no definite aetiological agent was demonstrated in those adults who contracted a post-operative "chest infection."

Summary

During the winter of 1958–9 bacteriological and virological investigations were made on all patients—179 adults and 117 children—admitted to the medical wards of St. Thomas's Hospital, London, suffering from an acute respiratory illness. 28% of illnesses in children and 22% of illnesses in adults were associated with an identifiable virus. Influenza A and B viruses were those most often found. The parainfluenza groups of viruses were responsible for very few infections.

Str. pneumoniae was isolated from 36% of the samples of sputum tested, *H. influenzae* from 22%, and *Staph. aureus* from 2%. No relationship was found between the presence of particular bacteria in the nasopharynx or sputum and evidence of virus infection.

No deaths occurred among the children, but among the adults there were 12 (6.7%). Seven patients (two children and five adults) developed a staphylococcal pneumonia after admission, and in six of these patients the pneumonia was due to a strain of *Staph. aureus* acquired from the hospital environment. Of the patients studied it was found that 24% of the children and 33% of the adults acquired a new strain of *Staph. aureus* during their stay in hospital. Most of these strains were resistant to more than one antibiotic.

This survey illustrates that respiratory disease accounts for more than one-third of all child and at least 15% of all adult admissions to a general hospital in the winter. The aetiology of these infections could be determined in about a quarter of the patients admitted.

We are grateful to the Governors of St. Thomas's Hospital for making a grant available from the Industrial Diseases Research Fund; to the physicians and surgeons of St. Thomas's Hospital for permission to study patients under their care; and to the nursing staff for their help in collecting specimens. We also thank Dr. M. Patricia Jevons for phage-typing the staphylococci, Dr. J. C. McDonald for much helpful advice, and Miss S. Stephens and Miss A. Deacon for technical assistance.

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STAPHYLOCOCCAL INFECTION IN A MEDICAL WARD

BY

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In recent years many papers have described staphylococcal infection in hospitals. Nearly all these papers have been concerned with surgical wards. We here give an account of a pilot survey of staphylococcal sepsis as seen during the course of one year in a medical ward.

Materials and Methods

The medical ward observed between October, 1958, and September, 1959, contained 26 beds, 24 in the open ward and 2 in side-rooms. The ward was equipped with cotton curtains between the beds: woollen blankets were in use. No attempt was made to isolate patients with sepsis.

Nasal swabs were taken from patients on admission or as soon after as possible, and thereafter at weekly intervals. A clinical record was made of all forms of sepsis, and specimens of sputum, urine, etc., were examined whenever indicated by the clinical condition. In the course of the year 190 specimens of pathological material were examined (73 sputa, 43 urines, and 74 miscellaneous). All staphylococci isolated were tested for coagulase production and phage-type by the methods described by Anderson and Williams (1956). In this paper only coagulase-positive strains have been considered. They are described as *Staph. aureus* or just staphylococci.

Results

Staphylococcal Sepsis.—During the year 349 patients were admitted: 9 (2.6%) were admitted with sepsis and 13 (3.8%) of the remainder developed staphylococcal sepsis. Of the 22, 9 had a lower respiratory infection, one progressing to an empyema and another to a lung abscess. Nine patients suffered from infection of the skin or subcutaneous tissues, one had sinusitis, one an extensive ulcer in the mouth, and two had staphylococcal enterocolitis. Two patients had a terminal septicaemia and one a staphylococcal urinary infection. Three patients each had two staphylococcal incidents. There was more sepsis amongst the 90 patients with malignant disease or disease of the blood than among the 259 who had neither; 13 (14%) of the former developed staphylococcal sepsis as compared with the 9 (3%) of the latter. It was not easy in every case to assess the significance of the sepsis. Nine of the patients were admitted with existing sepsis, and the patient with sinusitis was admitted because of it. Five of the infected patients with malignant or blood disease died, and in four the infection contributed to the cause of death. Of the remaining patients the infection was regarded as serious in 10 and of moderate or slight severity in the others.

Sepsis in Relation to Type of Staph. aureus.—Only two patients were infected with the same type of staphylococcus (75/77, resistant to penicillin, tetracycline, and streptomycin). One of these patients had a urinary infection, the other enterocolitis. They were in the ward together. Other tetracycline-resistant staphylococci—types 80, 52/80+, 52/80, 7/47/54/75/77, and 75A—were isolated from lesions, but only of single patients. There was no evidence of spread to produce sepsis in other patients. This was surprising, in view of our previous experience in surgical wards and of the evidence on the change of nasal staphylococci put forward in the next section.

TABLE I.—*Nasal Carriage of Staph. aureus*

	No.
Patients never nasal carriers	144
,, carriers at some time	205
Patients not carriers on admission, becoming carriers	57
Patients admitted as carriers, changing nasal type of staphylococcus	37
Total patients acquiring a new staphylococcus	94 (27%)

Nasal Carriage of Staph. aureus.—Table I gives the salient observations on the nasal carriage rate. Almost a third of the patients acquired a new staphylococcus in the nose during their stay in hospital. Antibiotics were given to 107 of the 349 patients. There was no evidence that antibiotic treatment increased the chance of a patient acquiring a penicillin-resistant strain.

Sepsis in Relation to Nasal Carriage of Staph. aureus.—One hundred and forty-four patients were not nasal carriers on admission, and remained free from nasal staphylococci during their stay in the ward. Two of these (1.4%) were septic on admission. The remaining 205 patients were either carriers on admission or became so subsequently. Twenty (10%) were admitted with or developed sepsis. No fewer than nine patients were admitted with sepsis. Table II shows these patients and the patients developing sepsis while in the ward. The staphylococci from the septic lesions have been compared with those carried by each patient in his nose. Four of the nine patients admitted with sepsis were found to have staphylococci of the same type in the nose and lesion. Of the patients becoming septic in the ward, seven developed sepsis due to the same type of staphylococcus as that isolated from the admission nasal swab, and six became septic with a staphylococcus which differed from any staphylococcus isolated from their nose on admission or during their stay. These staphylococci were presumably acquired in the ward, though their sources could not usually be determined. In no case did a patient develop sepsis due to a staphylococcus acquired first in the nose during the stay in hospital.

TABLE II.—*Staphylococcal Sepsis in Patients with Malignant and Blood Diseases, and Other Diseases, Related to the Patients' Nasal Staphylococcus*

	No.	Admitted with Sepsis Due to Staphylococcus of		Admitted with No Sepsis, Developed Sepsis in Ward Due to Staphylococcus of		
		Type Present in Nose on Admission	Type Not Found in Nose on Admission	Type Found in Nose on Admission	Type Acquired in Nose in the Ward	Different Type from that in Nose
Malignant or blood disease	90	3	1	5	0	4
Other diseases	259	1	4*	2	0	2
Total	349	4	5	7	0	6

* Includes two patients never found to be carriers.

Survey of all Medical Wards

We were surprised that we had not found more instances of staphylococci spreading from patient to patient and causing sepsis. We had, however, only a few septic patients, and the absence of spreading infection might have been a matter of chance. To test this proposition a survey was made of 243 male and female patients in the 10 medical wards of this hospital between February 17 and 23, 1960. Pathological specimens were collected where indicated, and 83 specimens (37 sputa, 22 urines, and 24 miscellaneous) were examined.

Only eight patients were found to be suffering from staphylococcal sepsis. In four wards there was no sepsis, in each of four there was one patient septic, and two wards each had two septic patients. Table III lists the septic patients, and the phage type of the staphylococcus involved. In the two wards each with two patients septic, all the four staphylococci were of different phage type.

TABLE III.—*Staphylococcal Sepsis in* 243 *Patients in Ten Medical Wards*

Patient's Primary Diagnosis	Source of Staphylococcus	Phage Type of Staphylococcus	Antibiotic Sensitivity of Staphylococcus	
			Sensitive	Resistant
Krohn's disease (pneumonia)*	Sputum	*52A+*	P.T.	
Cerebral tumour* ..	Carbuncle	80	C.E.	P.T.
Leukaemia	Boil	80	C.E.	P.T.
,, ...	Ulcer	*52+*	P.T.	
Dermatitis†	Infected dermatitis	80	T.	P.
Rheumatoid arthritis†	Sinus on hip	47/53/75/77	C.E.	P.T.
Urticaria	Infected urticaria	52A	T.	P.
Rheumatoid arthritis ..	Abscess on buttock	Not typable	P.T.	

* Patients in same ward. † Patients in same ward.
P. = penicillin. T. = tetracycline. C. = chloramphenicol. E. = erythromycin.

Discussion

We were somewhat surprised to find that in a ward with so many patients suffering from blood and other diseases thought to predispose to staphylococcal infection only 6% developed staphylococcal lesions. Moreover, 9 of the 22 septic patients already had the sepsis when they were admitted, and only two patients were infected with any one type of staphylococcus. Apart from this there was no evidence of infection spreading from one patient to another and causing disease in them. This observation recalls the suggestion of Rogers and Bennett (1958) that though staphylococcal infection was not uncommon in medical wards epidemic infection is rare. It is of course possible that, had our observations been continued, we might have found more examples of case-to-case infection, but our rapid survey of the other medical wards of the hospital did not suggest that this is a very common phenomenon. Only 8 of the 243 patients had staphylococcal disease at the time of the survey, and there was no evidence of a common type in any of the wards.

It would therefore appear that spreading staphylococcal infection was not a feature of the ward we observed for a year or within the short period of our survey for the other medical wards. This might reflect the absence of any strains of *Staph. aureus* with epidemic properties, but several of the strains that we isolated have been associated with spreading infection in surgical wards. Perhaps the lack of open wounds and possibly of patients with post-operative chest conditions in medical wards impose a different behaviour on the staphylococcus so that the spread of the organisms with resultant sepsis is rarer.

Our observations in surgical wards suggested that patients who carry staphylococci in their noses are more likely to suffer post-operative wound sepsis than those who do not, and that in fact the nasal strain is not uncommonly the source of the wound infection (Williams *et al.*, 1959). The association between the nose and the lesion strain is confirmed in the medical ward that we have studied, but there was no evidence at all that the staphylococci which were spreading among the patients' noses in the ward were in fact later producing disease. It was striking that seven of the patients developed staphylococcal sepsis while in the ward with a staphylococcus that had been present in their nose at the time of admission.

Summary

A pilot survey has been made of staphylococcal sepsis in a medical ward during the course of one year. Of 349 patients, 9 were admitted with sepsis and 13 of the remainder developed it. Only two patients were infected with any one type of staphylococcus. Apart from this, there was no evidence of infection spreading from one patient to another and causing disease.

In a rapid survey of 243 patients in all the medical wards of the hospital, only eight had staphylococcal sepsis at the time and there was no evidence of a common type in any of the wards.

We thank Dr. R. Bodley Scott and Dr. W. E. Gibb for permission to carry out this investigation in their ward, the nursing staff for their unfailing co-operation, and the members of the medical staff of St. Bartholomew's Hospital for permission to carry out the survey. We are indebted to the Medical Research Council for a grant supporting this work.

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"[Jacques Loeb's] phenomenal memory . . . coupled with a very active, enquiring mind with a high degree of originality was undoubtedly responsible in a large measure for his success. Beyond this he had that rare gift of scientific intuition, recognizing where progress was significant and feasible and where further study was futile. . . . He was an omnivorous reader in science generally. Literature as such had little interest or appeal for him. In fact, it is from his extensive reading that he developed many of his new, simple and useful techniques in solving problems. . . . In this writer's extensive acquaintance with the leading physicists of the atomic era he knows of no one, with the possible exception of J. J. Thomson, who spent a greater proportion of his waking hours thinking of his work. . . . Finally there is one more characteristic of scientific work that was vital to his success. This was the exacting and intelligent but meticulous care he used in repeating and checking all his observations before publication. The writer knows of few physicists with the possible exception of Rutherford who made as sure of the accuracy of experimental data published as did Jacques Loeb." (Dr. L. B. Loeb's recollections of his father, Jacques Loeb: *Rockefeller Institute Quarterly*, Autumn, 1959.)

TRANSFER OF STAPHYLOCOCCUS PYOGENES FROM INFECTED TO NON-INFECTED HOSPITAL BEDS

BY

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Much has been published on the role of bedding in hospital infection and the fibre composition of hospital dust (Rountree, 1946; Girdlestone and Bourdillon, 1951; Clarke, Dalgleish, Parry, and Gillespie, 1954; Pressley, 1958; Gardner and Pope, 1960). Clarke *et al.* found that the oiling of bedding and ward floors greatly reduced the total bacterial count in the air, and that the number of staphylococci in the air fell by 60% as compared with a control ward without oiling. The number of infected particles which could be shaken from oiled sheets and blankets was 25–30% and 10% respectively of the total number which could be shaken from untreated bedding. Despite this degree of control, the cross-infection rates in the two wards remained the same. A similar finding was reported by Rountree (1947), using oiled blankets, and by Begg, Smellie, and Wright (1947), who oiled floors, personal clothing, and bedding while investigating streptococcal cross-infection. It appears, therefore, that ward dust may play but a minor part in hospital cross-infection.

In an interim report on the cleansing and sterilization of hospital blankets (King Edward's Hospital Fund for London, 1959) it is stated that it has not yet been established to what extent blankets may be a source of infection in hospital wards. The part played by airborne fibres and the bacteria attached to them must be similarly kept in perspective when assessing the significance of the results obtained by Pressley (1958) and by Gardner and Pope (1960). While it is generally agreed that it is undesirable for a patient to be in direct contact with infected sheets and blankets, the danger of such fomites in terms of cross-infection can be assessed only by demonstrating the transfer of pathogens to other beds in the same ward. Anderson and Sheppard (1959) have shown that staphylococci can be disseminated from an artificially infected blanket by shaking and sweeping. The following experiment was designed to investigate what might occur under more realistic conditions with several beds and a routine bed-making procedure.

Materials and Methods

A renovated ward, 34 by 28 by 14 ft. (10.4 by 8.5 by 4.3 m.), was used for the experiment. No patients were admitted, but eight hospital beds 34 in. (86 cm.) high were placed in position, four on each side of the ward (Fig. 1). A space of 4 ft. (1.2 m.) was allowed between each bed.

The beds were numbered 1–8, and all but two were made up in the conventional manner with a sponge-rubber mattress, two sheets, one blanket, and one pillow. All bed-linen was drawn fresh from store. Blankets were 100% wool, and sheets and pillow-slips were of cotton. The two remaining beds were experimentally infected with coagulase-positive staphylococci. Bed 6 was made up with three blankets and no pillow, and constituted an "all-wool" bed. The centre blanket of this bed was contaminated with an organism of phage type 6. Bed 3, which was of conventional composition, had a blanket infected with phage type 3C/55, a sheet infected with phage type 7/31B/42E, and a pillow-slip infected with phage type 6/7/42E/47/53/54/75/77. These strains were quite distinct and maintained their complete pattern throughout the experiment.

Bedding was infected by pouring diluted overnight broth cultures of the organisms over sterile sponge plastic rollers, and applying them to the surface of the material.

Three samples from each blanket and sheet and two from each pillow-slip were taken before the introduction of infection, and thereafter daily at 12 noon. Sampling was carried out using the percussion technique, a 200-g. weight being dropped on to 80 sq. cm. of blanket five times from a height of 24 cm.

Blood-agar plates were used for all cultures, and persons carrying out sampling wore sterile masks, caps, gowns, and rubber gloves. The sampling apparatus was swabbed with chlorhexidine in spirit between beds so as to minimize the transmission of organisms by contact, and sampling was always carried out from bed 1 to bed 8 in a clockwise direction. At 1.30 p.m. each day two nurses wearing sterile surgical clothing entered the ward and made the beds, beginning at bed 1 and finishing at bed 8. A standard bed-making routine was employed throughout, and at its conclusion sedimentation plates were placed on the pillow of each bed and the ward was locked until noon on the following day, when the plates were collected and sampling began again. All windows were kept closed and no sweeping or cleaning was carried out. No persons were permitted to enter the ward except those engaged in the experiment.

This orderly procedure continued until the 13th day of the experiment. On this day, after bed-making, the ward was swept before sedimentation plates were placed in position. Sampling then continued for a further two days.

Results

The spread of organisms is shown in Fig. 1, the arrows depicting the direction of spread and the numbers indicating the day on which the transmitted organisms were detected. There were 22 forward transfers and seven retrograde ones, indicating that contact spread by nurses and samplers and aerial spread were both operating. There were 18 cases of spread from the blanket on the all-wool bed, four from the blanket on the mixed bed, four from the sheet, and three from the pillow-slip. These differences are not significant, as the counts on the first two days taken from the artificially infected blanket on bed 6 were approximately four times those from the other infected bedding, showing that it had been more heavily contaminated. The 62 control samples taken before the start of the experiment revealed only six staphylococcal colonies from the stock bedding. Four of these were non-typable and two belonged to group III, but were different from any of the marker strains used. It is felt that this small amount of natural infection played little part in the

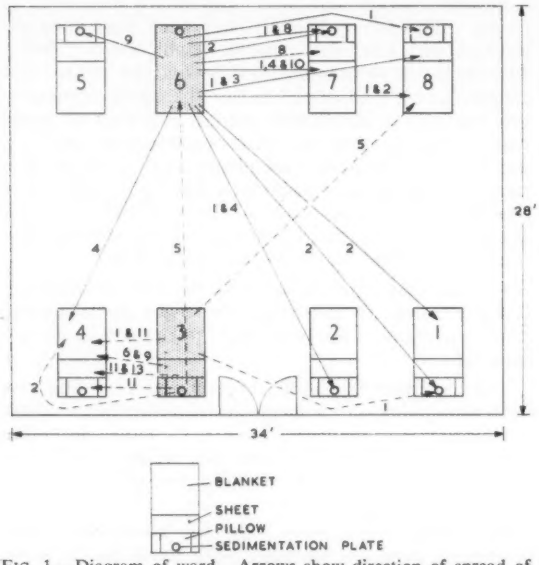

FIG. 1.—Diagram of ward. Arrows show direction of spread of organisms, and the numbers indicate the day on which the transmitted organisms were detected.

subsequent spread of test strains and the interpretation of the results. The total staphylococcal count on the artificially infected bedding fell daily. There was little difference between survival on wool or cotton, and Fig. 2 is derived from the total counts on all 11 sample plates (6 from blankets, 3 from sheets, and 2 from pillow-slips).

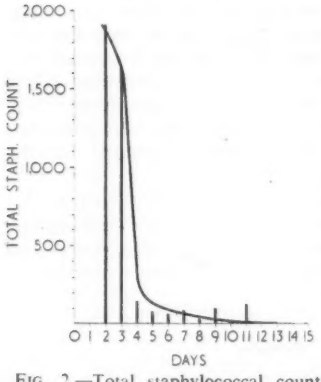

FIG. 2.—Total staphylococcal count during the 13 days of the experiment.

Discussion

With only two daily disturbances of eight beds in a closed ward, it is interesting to observe just how much spread occurred, both by contact and by the aerial route. One can only speculate upon the degree of dissemination that might have taken place had the ward been fully occupied and subject to the usual disturbances of cleaning and sweeping. However, it is difficult to reconcile these results with evidence showing that ward dust plays only a minor part in staphylococcal cross-infection. The answer possibly lies in a consideration of the size of the infecting dose of organisms. While these experiments detect individual cells, or at most small groups of cells, the minimal infecting dose of *Staph. pyogenes* is probably many thousand times this number. As Elek (1959) states: "The most convincing single argument against aerial infections being common is the great prevalence of staphylococci in the air and dust and the relatively low incidence of disease, even when epidemic types are present in the dust."

Gardner and Pope (1960) found that an average of 95.8% of the fibres they collected were cellulose and 4.2% were wool. Their results indicate that there was an average of 7,500 organisms per mg. of fibre and an average of 2.8 coagulase-positive staphylococci in this quantity of fibre. It cannot be assumed from these results that cellulose fibres are responsible for the spread of staphylococci. Logically, 4.2% of 1 mg. of the sampled fibre (the woollen moiety) could easily carry the calculated 2.8 staphylococcal cells, and on the basis of these figures cellulose need scarcely be implicated at all. The present work indicates that wool and cellulose disseminate staphylococci equally well, and there is certainly no case for specifically incriminating one particular fibre.

Gardner and Pope have suggested that woollen blankets, being of a close weave, may spread infection by shedding cellulose fibres loosely trapped on their surface. This has not been substantiated by the present experiments, for staphylococci were spread from an infected woollen blanket lying between two other blankets and having no contact with cotton. In examining bed 3, ten separate colonies from each sample plate were typed so that the amount of spread between blanket, sheet, and pillow-slip could be determined. From the infected blanket, 70% of the organisms recovered throughout the experiment were the marker strain, 17% were from the adjacent sheet, and 13% from the pillow-slip. From the infected sheet, 65% of the organisms recovered were the marker strain, 32% came from the adjacent blanket, and 3% from the pillow-slip. Thus there would appear to be an equal amount of spread between the two types of fibre when blanket and sheet or pillow-slip are in contact.

The rapid fall in the viable count observed in sampling the artificially infected bedding is of considerable interest. Seventy-two hours after infection, total counts indicated a reduction from 1,893 to 142 organisms. After 13 days no pathogenic cocci could be detected in 22 samples. If these results pertain to conditions existing in surgical wards, then bedding which is infected with pus or other body fluids is most dangerous during the 72 hours after soiling. That the total number of organisms is an index of the risk of transfer is shown by the fact that in these experiments 14 transfers were detected in the first two days and only 15 in the subsequent 12 days.

While these experiments with bedding and fibres are undoubtedly of theoretical interest, sufficient conflicting work has now been published on the mechanisms of cross-infection to suggest a more direct and radical approach to the problem. The provision of "clean" and "infected" wards for surgery, the routine preoperative nasal swabbing of patients, and the exclusion from clean wards of all cases with active skin sepsis: these measures seem more rational than vain attempts to evict infection from wards where it is firmly established and disseminated by an almost unpredictable number of mechanisms. While it is unlikely that a staphylococcal-free environment can be achieved, the weight of evidence suggests that there is a minimal infecting dose of organisms, and the treatment of staphylococcal sepsis as an infectious disease should go a long way towards reducing the incidence of cross-infection in hospitals.

Summary

An experiment is described which demonstrates the spread of staphylococci from two artificially infected beds in a small ward.

A simple bed-making routine results in considerable dissemination from both wool and cotton fabrics. Spread to other beds appears to occur both by direct contact and by the aerial route.

The number of viable organisms recovered from the infected bedding fell by 90% after the first 72 hours.

The significance of these results and those of other workers in relation to the problem of hospital cross-infection is discussed.

We are indebted to Dr. R. L. Willing, medical superintendent, Northfield Infectious Diseases Hospital, and to members of the nursing staff, whose interest and co-operation made this experiment possible. Our thanks are also due to Dr. Bernard Nicholson, medical superintendent, Royal Adelaide Hospital, for supplies of hospital bedding.

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CONTROL OF STAPHYLOCOCCAL INFECTION IN A MATERNITY HOSPITAL

CLINICAL SURVEY OF THE PROPHYLACTIC USE OF HEXACHLOROPHANE

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The problem of staphylococcal infection in maternity units has been studied by many investigators during the last two decades (Knott and Blaikley, 1944; Allison and Hobbs, 1947; Barber *et al.*, 1953; Edmunds *et al.*, 1955; Forfar *et al.*, 1955; Gillespie *et al.*, 1957).

It is generally agreed that most infants in maternity units become colonized by staphylococci soon after birth and are then the most important immediate source of infection (Cunliffe, 1949; Parker and Kennedy, 1949; Hutchison and Bowman, 1957; Forfar and Maccabe, 1958). Gillespie *et al.* (1958) came to the same conclusion and showed that the sites of heaviest colonization are the umbilicus, nose, groin, and perineum. They also showed that infants who became heavily colonized by the second day of life subsequently suffered from clinical infection more often than other infants.

The umbilicus, which is an open wound, is especially liable to colonization by staphylococci and streptococci (Coventry and Isbister, 1951; Boissard and Eton, 1956; Kwantes and James, 1956).

Various techniques of nursing care of the newborn infant have been advocated to prevent spread of infection, but the observation of Farquharson *et al.* (1952), that the use of hexachlorophane solution for bathing newborn infants was followed by a much reduced incidence of clinical staphylococcal infection, is of particular interest and importance. Jellard (1957) also reported a reduction of cross-infection after the application of another disinfectant, triple dye, to the umbilicus.

Gillespie *et al.* (1958) evaluated several methods of reducing staphylococcal cross-infection in the nurseries of the Bristol Maternity Hospital. They found that the most striking reduction was attained when colonization of the umbilicus and skin was prevented by means of a dusting powder containing hexachlorophane ("sterzac") which could be applied repeatedly to a large area of the body surface. Subsequently (Simpson *et al.*, 1960) they showed that the best results were obtained by starting to apply the powder before the infant left the labour room and by continuing to apply it to the whole trunk, including the umbilicus and perineum, every time the napkin was changed. The incidence of septic lesions of the skin was reduced from about 6% to less than 1%.

In this paper we describe the effects of using the same method in the maternity unit of Southmead General Hospital, Bristol. This is a much larger maternity unit than the Bristol Maternity Hospital, and for several years has suffered from a higher incidence of severe staphylococcal lesions among infants and mothers. This situation may have been partly due to the fact that this maternity unit is extremely busy and often overcrowded and has a large number of pupil midwives and medical students in training, so that it is not easy to maintain rigid standards of technique.

However, another reason for the more severe infection was probably the endemic presence in the hospital of a type-80 staphylococcus which for several years caused many infections, in the maternity and general wards of the hospital, of a severity which resembled those first described by Rountree and Freeman (1955).

Before the introduction of hexachlorophane, several measures had been adopted to reduce cross-infection; sterilization and aseptic techniques had been reviewed, and chlorhexidine hand-cream was used by the nurses, but the incidence of sepsis remained high. A series of swabs taken from the umbilici of the infants during the winter of 1956–7 showed a high rate of staphylococcal colonization, comparable with that described by other authors.

Material and Methods

The maternity unit contains 140 beds, between 3,650 and 3,750 live births occur there annually, and about one-fifth of the mothers are admitted in emergency as unbooked cases. Most of the lying-in beds are in two modern single-story pavilion-type buildings, which have no undercover communication with each other. Each block accommodates 44–48 mothers in single, double, or four-bedded rooms. "Rooming-in" is practised in the single and double rooms, provided the condition of mother and child permits. The remaining

babies are nursed under good conditions in two large nurseries on each block, the population of each nursery ranging from 6 to 16 infants. Near each nursery is an isolation room to which any infected infant is immediately removed. There is a separate modern isolation block with its own labour room suite, where mothers with known or suspected infection are delivered and nursed.

The premature-baby unit has improvised and inadequate accommodation on one block and is constantly overcrowded with an annual admission rate of about 350 infants, about one-sixth of whom are admitted to the hospital within 24 hours of birth at home, or in other maternity units.

Record of Infection

Since 1949 fortnightly meetings have been held in this hospital to survey perinatal and neonatal mortality and morbidity, and the incidence of infection has thus been kept regularly under review. The paediatric registrar and senior house officer are responsible for the daily supervision of all sick and abnormal babies in the maternity department, and the name and ward of every baby in whom infection is found are entered in a diary against the date when it is first noticed. In this way a very accurate record has been available of the incidence of infection, and this has enabled us to evaluate the hexachlorophane method of skin care.

Care of the Skin and Umbilicus

Since 1950 the following technique of skin care has been standard throughout the department, including the premature baby unit.

Skin Cleansing.—At birth babies are wrapped in a sterile towel and are not bathed. Blood, meconium, and excessive vernix are removed from the face and hands only, using warm tap-water in a sterile bowl and sterile wool swabs. The skin is dried with sterile swabs. (Cleaning of premature and sick babies is postponed until the infant's condition permits.) The babies wear muslin napkins and a cotton nightgown which is changed at least once daily. Babies are changed in their cots, which are fitted with an individual locker containing a metal swab-tin with lid and benzalkonium chloride (0.01% solution), which is used routinely for cleansing buttocks. Healthy babies who remain in hospital for 10 days are sometimes bathed on the day of discharge for demonstration purposes to the mother and pupil midwives, but many babies are not bathed while in hospital; the skin is dried with clean muslin napkins.

Umbilical-cord Treatment.—(1) The cord is tied and divided between two sterile thread ligatures, 2½–3 in. (6.3–7.5 cm.) from the umbilicus and wrapped in a sterile gauze swab. (2) After six hours the cord is re-ligated and cut at ¾ in. (2 cm.) from the umbilicus. Collodion is painted with a sterile swab over the cut end and no dressing or binder is applied. (Early in 1957 plastic wound-dressing, sprayed over the whole cord, was substituted.) (3) After separation of the cord, the stump is left uncovered and is not cleaned unless discharge is present, when it is swabbed four-hourly with industrial methylated spirit and dusted with sterile zinc, starch, and boric powder.

Application of Hexachlorophane Powder

On April 27, 1958, care of the skin and umbilicus was altered to that advocated by Gillespie *et al.* (1958) as follows. (1) At six hours after birth the cord is re-ligated ¾ in. (2 cm.) from the umbilicus and incised, and the whole stump and surrounding skin are sprayed with an antiseptic plastic solution ("octaflex"). (2) Hexachlorophane powder is then applied liberally to the trunk, particular care being taken to treat the umbilicus, groin, perineum, and axillae. (3) The cord and napkin area are subsequently powdered whenever the napkin is changed, and the trunk is powdered once daily with the routine change of nightgown.

One tin of octaflex spray was issued to each nursery; this sufficed for about 120 babies. Each baby was supplied with its own sprinkler tin of powder, the tins being returned to the dispensary for sterilization and reissue after discharge of the baby. Each tin contained enough powder for about 28 days' use.

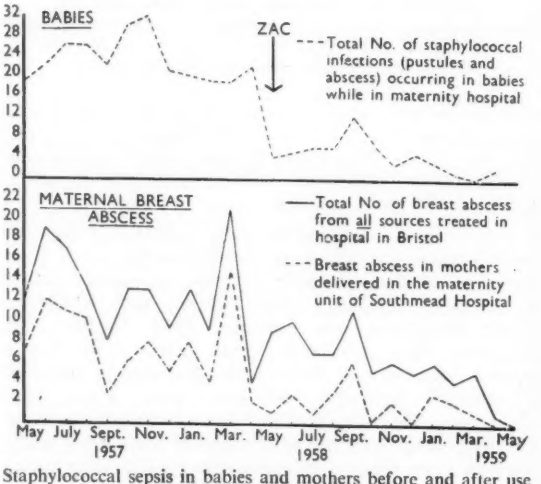
This new technique was continued until April 25, 1959, and the incidence of skin sepsis was then compared with that of the previous year. No other alterations were made in the routine care of mothers and babies during the period under review.

Results

There were 3,721 live births in Southmead Hospital during the first year, from April 27, 1957, to April 26, 1958. Pustular dermatitis occurred in 247 infants, including two cases of pemphigus neonatorum, and 30 infants had staphylococcal abscesses—an overall incidence of staphylococcal sepsis of 7.4% of live births. During this period 344 infants were nursed in the premature-baby unit; 50 of these developed pustular dermatitis and three had staphylococcal abscesses—an incidence of 15.4%.

Within a month of the introduction of hexachlorophane powder on April 27, 1958, there was a pronounced and sustained fall in the incidence of staphylococcal sepsis of the skin among the infants. This improvement was most pronounced in the premature-baby unit, where the incidence of minor sepsis has always been a problem.

During the second year, from April 27, 1958, to April 26, 1959, among 3,650 live births there were 50 infants who developed pustular dermatitis and 4 infants had abscesses, an incidence of skin sepsis of nearly 1.5%. 352 infants were nursed in the premature-baby unit; of these 9 developed pustules and none had abscesses,


BABIES
ZAC
Total No. of staphylococcal infections (pustules and abscess) occurring in babies while in maternity hospital
MATERNAL BREAST ABSCESS
Total No of breast abscess from all sources treated in hospital in Bristol
Breast abscess in mothers delivered in the maternity unit of Southmead Hospital
May July Sept. Nov. Jan. Mar. May July Sept. Nov. Jan. Mar. May
1957
1958
1959

Staphylococcal sepsis in babies and mothers before and after use of hexachlorophane (zac) powder.

an incidence of 2.6%. The graph shows the monthly incidence of these infections during the years under review.

There was no case of severe hypersensitivity to the chemicals, though three infants developed some redness of the skin in the napkin area which did not improve until the use of the powder was discontinued. We confirmed the experience of Gillespie *et al.* (1958) that there was no delay in separation of the cord

Some months after the introduction of the hexachlorophane dusting powder, Professor Gordon Lennon informed us that there had been a reduction in the number of mothers who developed breast abscesses. Accordingly a survey was made of the incidence of breast abscesses in women delivered in this hospital and elsewhere in the city.

Many breast abscesses develop after the mother has left the maternity hospital and are then referred back to the casualty department or surgical wards of hospitals for surgical treatment. In Bristol, the practice is to refer mothers with breast abscesses to the two major casualty departments in the city, and a relatively small number are admitted direct to the wards.

Hospital records were searched for all cases of breast abscess treated by Bristol hospitals during the period of this survey. The place of delivery and the bacteriological report were ascertained for each patient.

During the year May 1, 1957, to April 30, 1958, 91 mothers who were delivered in Southmead Maternity Unit developed staphylococcal breast abscesses, an incidence of 2.4%. During the next year, when hexachlorophane was in use, there were 22 breast abscesses, an incidence of 0.6%. This difference is statistically significant.

The graph shows the monthly occurrence of breast abscesses in mothers delivered in Southmead Hospital as compared with the total number of breast abscesses treated in the hospitals concerned during the period under review (mothers delivered at Bristol Maternity Hospital were excluded from this comparison because hexachlorophane and other measures were in use there for most of this period). The curves show that the same trends of infection occur simultaneously in the Southmead mothers and babies. The incidence of abscesses in mothers delivered in other hospitals could not be calculated, but the number in the two years showed no significant change.

Discussion

In the prevention of cross-infection in maternity units, great stress has always been laid on the importance of aseptic nursery technique. We do not suggest that any relaxation in technique should be countenanced, but at the same time it must be emphasized that the maintenance of these techniques is very difficult outside the operating-theatre, and implies a rigidly disciplined staff who have adequate time, with infrequent interruptions in their work. Experience has shown that inevitably breaks in technique occur sometimes. There are also economic limits to the extent to which techniques involving the use of equipment and laundry can be applied.

It is therefore essential to realize the great importance of the "load of infection" provided by the rapidly proliferating staphylococci on the common sites of some infants as a major factor in cross-infection in nurseries. Unless this load is actively reduced, measures intended to prevent the spread of the organisms among infants who are all handled by the same staff are likely to prove disappointing. The frequent and liberal use of hexachlorophane dusting powder has proved to be a cheap and effective means of reducing the load of infection and has greatly diminished the incidence of clinical infection in the infants and their mothers. The annual cost of hexachlorophane powder and plastic spray solution was £115, or sevenpence per baby.

Conclusions

This study, carried out in a large maternity unit where clinical staphylococcal infection had remained at a steady high level for several years, showed that the introduction of a new technique of treatment of the umbilicus and skin of the newborn infants with a dusting powder containing hexachlorophane produced a strikingly significant reduction in the incidence of clinical infections in both babies and mothers without causing any undesirable reactions. The treatment is simple to carry out and the cost is moderate.

We are grateful to Dr. W. A. Gillespie for all his helpful advice, and particularly for his assistance with the retrospective study of breast abscess; to the midwifery staff who co-operated so well in carrying out the treatment, and in particular Sister Carter, who gave valuable assistance with the pilot survey; and to Professor Gordon Lennon and Professor A. V. Neale, who read the manuscript and offered most valued criticisms.

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United Kingdom exports of drugs and medicines in 1959 reached the peak figure of £40.1m. The exports of vitamins were £2.7m. and of antibiotics £2.9m., although exports of penicillin declined. Exports of miscellaneous proprietary medicines rose by 11% to £11.7m. The major share of pharmaceutical exports went to Commonwealth countries, the principal customers being Australia (£4m.) and Nigeria (£2.6m.). The other chief markets were the Irish Republic (£2m.), New Zealand (£1.9m.), India (£1.4m.), the Union of South Africa (£1.4m.), Pakistan (£1.3m.), Canada (£1.3m.), Ghana (£1.2m.), and U.S.A. (£1.2m.). Exports to Canada exceeded £1m. for the first time. There was, however, a sharp decline in exports to China—recently a fluctuating market—from £918,000 (in 1958) to £175,000. The expansion in local manufacture and the financial shortages in India and Pakistan were responsible for slight falls in exports to those countries. (*Annual Report and Year Book, 1959–60*, Association of British Pharmaceutical Industry.)

GLOMERULONEPHRITIS IN AFRICANS IN UGANDA

BY

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Nephritis is a common disease in the African (Gelfand, 1957) and is a common cause of death from hypertensive heart failure. Becker (1946), from Johannesburg, found that out of a total of 3,000 necropsies hypertensive heart failure was present in 247 cases and that 85 of these were due to glomerulonephritis, the great majority being in the chronic phase of the disease. Uys (1954), again from necropsy studies, found glomerulonephritis to be the commonest cause of secondary hypertension. In Uganda, Davies (1949) found "some form of nephritis" to be present in 301 out of 2,994 necropsies, and, in these, congestive heart failure was the commonest single mode of death. Raper (1953), however, reporting on "nephritis and allied lesions in Central Africans," found only 23 cases of nephritis among 92 necropsies in which advanced renal disease had been present.

No comprehensive clinical studies of glomerulonephritis have been made on the African native in his home environment, the only recorded study being an analysis by Furman (1955) from Johannesburg of the case-records of European and Bantu patients suffering from nephritis. The present study was therefore made in order to learn more of the clinical features, the biochemical and histological findings, and, if possible, the course of glomerulonephritis in the Bantu.

Material and Method.—Between January, 1956, and February, 1957, all patients admitted to the wards of a medical unit, Mulago Hospital, in whom clinical evidence of renal disease was present, or who were otherwise hypertensive, were studied. An exception was made in the case of patients in whom transient albuminuria was present during the course of another illness—for example, pneumococcal pneumonia. Patients who were found on investigation to be suffering from renal disease other than glomerulonephritis—for example, pyelonephritis, amyloidosis, or essential hypertension—have been excluded from the present series and are reported elsewhere (Leather, 1959; and awaiting publication).

The details of the method used in this study are also recorded elsewhere (Leather, awaiting publication).

Findings.—Glomerulonephritis was found in 33 of the 67 patients in the entire study. It was the commonest cause of renal disease in each of the first four decades, and was present in 12 of the 13 children studied. It was not always possible to tell which stage in the natural history of the disease process a particular patient had reached. Classification, which was therefore difficult, has been made from a combination of clinical and histological findings and is as follows:

I. Glomerulonephritis in childhood	..	12 cases
II. Glomerulonephritis in adults	.. ..	21 ,,
"Acute" nephritis	.. ..	3 cases
Rapidly progressive "acute" nephritis	.. ..	3 ,,
Subacute nephritis	.. ..	1 case
Latent nephritis	.. ..	1 ,,
"Intermediate" nephritis	..	3 cases
Chronic nephritis	.. ..	10 ,,

Glomerulonephritis in Childhood

There were 12 children (6 boys and 6 girls) in whom a diagnosis of glomerulonephritis was made. The youngest was 4 years and the oldest 13. Nine of them were under 9. The youngest patients in the group were mostly girls. Various tribes were represented, and were in roughly the same proportion as for all Mulago Hospital admissions.

The dietary history revealed that about half the patients enjoyed a fairly good diet.

In seven patients there was a history of a recent infection, usually of the upper respiratory tract. In four, symptoms of nephritis followed within 11 days. The presenting symptom was always swelling of the body, and had usually been present for two to three weeks before admission to hospital. The swelling generally began in the face and neck, and over the course of several days spread to the rest of the body, the abdomen being particularly affected. The onset of abdominal swelling was often preceded by colicky abdominal pain.

Urinary symptoms were not striking and no patient gave a history of passing bloody urine. One child had complained of pain in the loin and several had passed less urine since the onset of the swelling.

Five of the patients gave a history of a similar previous illness, including one patient (Case 1) who had had Henoch's purpura. In two cases there was a family history of a similar illness in other siblings which had proved fatal.

The most striking clinical finding on examination in the children was oedema, which was nearly always generalized and often gross. Apart from the severity of the swelling, the feature of most interest was the somewhat unusual distribution in the tissues of the neck. Thus, while the face was somewhat rounded and the eyes were puffy, the neck was especially swollen and the hollow between the angle of the jaw and the upper chest was sometimes even obliterated. In two children the neck was actually extended by this swelling. Ascites was usually considerable. Bearing in mind the age of these patients, a diastolic pressure of more than 80 mm. Hg was regarded as abnormal, and by these standards most of the children were hypertensive. In four the diastolic pressure was over 100 mm. Hg, and in two of these it was 150 mm. Where diastolic pressures were high the pulse pressure was small, and in both patients in whom the diastolic pressure was 150 mm. Hg the pulse was often impalpable at the wrist. In one of these (Case 2) examination of the fundi revealed that all the arteries were uniformly narrowed and appeared to be in spasm. One recent haemorrhage was seen. In other children the fundi were normal.

Urinalysis revealed considerable albuminuria in all cases. Microscopical haematuria was invariably present, but in no case was the urine ever obviously blood-stained or even "smoky." A few pus cells were usually present, but were not regarded as significant. Casts were present in nearly all cases. Culture of the urine was sterile in most instances. In the remainder various organisms were grown, and were thought to be due to contamination of specimens, not obtained by catheterization, from female patients.

In two children clinical evidence of malnutrition was present. In one the skin on the front of the legs was

scaling and atrophic, and in the other the changes of early kwashiorkor were present in the hair.

Investigations revealed a mild degree of anaemia in most instances. One patient was severely anaemic. Malarial parasites were seen in small numbers in films of the peripheral blood in six cases. The parasites were usually of malignant tertian malaria, which is the commonest form of malaria occurring in the locality.

The blood-urea level on admission varied between 28 and 62 mg./100 ml.; in most cases it was under 40 mg. However, from the levels to which the blood urea sometimes subsequently fell, it was concluded that most of the levels on admission were, in fact, raised. The blood cholesterol was usually over 300 mg./100 ml. Serum protein levels were reduced, the average total on admission being 3.8 g./100 ml. (globulin 3.2 g., albumin 0.6 g.). Electrophoresis, except in one patient, revealed the "nephrotic" pattern with increase of the α_2- and β-globulin fractions, with reduction of albumin and sometimes of γ-globulin. Urinary protein, on electrophoresis, was generally found to contain approximately 60% of albumin. The remainder was globulin, of which the α_2 fraction was present in the smallest quantity.

A renal biopsy specimen was taken from the eight eldest patients in the series, and in all except one the clinical diagnosis of glomerulonephritis was confirmed, the exception being a patient from whom the specimen was taken six weeks after admission to hospital, when recovery from the nephritic episode was advanced. In some the degree of histological change was mild, but in three patients chronic nephritis was present.

Treatment

Treatment consisted of bed rest, fluid restriction, and a low-salt high-protein diet. In six cases chloroquine was given to clear the malarial parasitaemia. Penicillin was sometimes given for various infections which developed in hospital. In three patients who made no progress over the course of several weeks on this regime steroid therapy was instituted. One of these left hospital during the course of treatment before any improvement had taken place, and did not return. Another responded only moderately to a second course of corticotrophin, the first having been without effect. The third patient, a boy of 12, with massive oedema and ascites which had worsened during the first 10 weeks in hospital, responded dramatically to cortisone therapy (Case 3).

The duration of stay in hospital varied from three weeks to six months. Oedema and ascites usually improved slowly during this time, and in five patients had cleared, or almost cleared, by the time of discharge. Improvement in ascites was less marked than improvement in oedema. The degree of albuminuria fluctuated in most cases, but had lessened by the time of discharge in about half of them. In only one did it disappear completely, and, apart from this patient and the one who responded so well to cortisone therapy, it was not generally possible to correlate reduction of albuminuria with improvement in oedema and ascites, or with rise of the serum albumin level. Microscopical haematuria improved greatly and casts usually disappeared from the urinary sediment. In hospital the blood-urea level fell in seven patients, usually to between 16 and 20 mg./100 ml., but in two other patients it rose after discharge from hospital. The long-drawn-out course of acute nephritis in many of these children is illustrated by the case of a girl of 5 (Case 4) who was admitted to hospital with a 16-days history of massive oedema. Renal biopsy showed the picture of acute nephritis. After a protracted illness she was discharged from hospital still in the nephrotic stage. When seen 18 months later, however, she was apparently fully recovered.

Follow-up.—Of the nine children who attended for follow-up examination, three appeared to have recovered, two had improved, two had had recurrence of swelling (which in one case may have followed acute otitis media), and two had deteriorated. One of these was admitted in hypertensive left ventricular failure and died. The other, who had had Henoch's purpura, had developed severe hypertension and the blood urea had risen to 80 mg./100 ml.

Overall, the prognosis of the nephritis from which these children were suffering was thought to be poor.

Case 1

A Muganda boy aged 13 had been in hospital for two months, two years before the present admission, suffering from "nephritis." Generalized oedema with gross ascites had been present for a month prior to that admission and fever had occurred two days before the swelling began. The findings had included albuminuria, with casts in the centrifuged deposit. The B.P. had been 110/90. Oedema and ascites gradually subsided over the course of several weeks. Since discharge from hospital a rash had appeared from time to time, situated mainly on the arms and the trunk. It consisted of raised blotches which itched considerably, and dark spots were present in the centre of the blotches. It lasted from several hours to several days, and was often followed by colicky abdominal pain and black stools. Twelve days before the present admission the patient had developed coryza, cough, and fever, and three days later his face began to swell.

On examination there was moderate oedema of the face and neck, with slight oedema elsewhere. A moderate ascites was present and the liver and spleen were palpable; the B.P. was 130/90 and the fundi were normal. Urinalysis revealed heavy albuminuria, scanty microscopical haematuria, moderate pyuria, and a few cellular, hyaline, and granular casts. Urine culture was sterile.

Investigations.—Hb, 88%; R.B.C., 5,200,000/c.mm.; small malignant-tertian malarial parasitaemia; blood urea, 40 mg./100 ml.; blood cholesterol, 480 mg./100 ml.; serum proteins, 4.5 g./100 ml. (albumin 1.2 g., globulin 3.3 g.). Urine specific gravity range: 10 (1015–1005). The maximum urea concentration was 2.0 g./100 ml. and the urea clearance was 44% and 33% of normal. Renal biopsy revealed that some glomeruli were totally scarred and shrunken, while in others the capsular space was reduced because of adhesions. There was tubular atrophy, with dilatation and hyaline material in tubules. Some interstitial scarring was seen, and thickening of the wall of an interlobular artery was noted. There was also arteriolar thickening. Biopsy diagnosis: chronic glomerulonephritis. Biopsy culture was sterile. Chest *x*-ray film and E.C.G. were normal.

With bed rest, high-protein low-salt diet, and fluid restriction to 3 pints (1.7 litres) daily, oedema and ascites slowly improved. The malarial parasitaemia was treated with chloroquine, and ankylostomiasis with tetrachlorethylene.

The blood-pressure varied between 120/90 and 110/70 and the urinary findings remained unchanged. A rash appeared on several occasions, mainly on the trunk and the limbs, and lasted about two hours; it itched, was blotchy and urticarial, but no petechiae were seen. There were no attacks of abdominal pain while the patient was in hospital. Occult blood tests were intermittently positive and remained so after worming. Blood urea remained between 42 and 46 mg./100 ml. The serum albumin fell to 0.7 g./100 ml.

and electrophoresis of the serum proteins revealed the "nephrotic" pattern. At follow-up examination five weeks after discharge from hospital the blood-pressure had risen to 210/130 and the blood urea to 79 mg./100 ml.

Comment.—Henoch's purpura was associated with glomerulonephritis of two years' duration. Changes of chronic nephritis found on biopsy. Hypertension and renal insufficiency developed during the period of observation. Prognosis: poor.

Case 2

A Muganda girl aged 6 years was admitted to hospital with a history of generalized swelling of the body which had started in the face seven weeks previously. There was no history of any previous infection or of any similar illness. Intermittent vomiting and abdominal pain had been present since the onset. The patient had had to get up three times a night for micturition since the swelling began, and shortly before admission this nocturia had increased up to 10 times nightly.

Examination showed considerable generalized oedema and ascites, the face and the neck being particularly swollen. The pulse was very weak and was sometimes impalpable at the wrist. The B.P. was 170/150 and the heart normal. Examination of the fundi revealed that all the arteries were uniformly narrow and appeared to be in spasm. One recent haemorrhage was present. Urinalysis revealed a heavy albuminuria with slight microscopical haematuria and a few granular casts in the centrifuged deposit. Urine culture was sterile.

Investigations on Admission.—Hb, 105%; R.B.C., 6,200,000/c.mm.; blood film, normal; blood urea, 28 mg./100 ml.; blood cholesterol, 450 mg./100 ml.; serum proteins, 4.7 g./100 ml. (albumin 0.6 g., globulin 4.1 g.). The maximum urea concentration was 1.4 g./100 ml. and urea clearance 24% and 40% of normal. Renal biopsy (Fig. 1) showed severe renal damage, 8 of the 29 glomeruli present in biopsy being reduced to hyaline scars and the remainder being partially scarred. Digitation of the glomerular tuft was observed and all the glomeruli were ischaemic to a greater or lesser extent. There was considerable ischaemic atrophy of the tubules, some of which contained hyaline casts.

Treatment with bed rest and a low-salt high-protein diet was instituted. Shortly after admission status epilepticus, attributed to hypertensive encephalopathy, developed and lasted for several days. It eventually responded to treatment with paraldehyde and phenobarbitone intramuscularly, and magnesium sulphate enemata. During seven weeks in hospital the oedema subsided but the hypertension persisted. The child returned to hospital twice during the next four months, once with a sore throat (from which no pathogenic organisms were isolated) and once with coryza. The clinical findings were unchanged though the blood urea at the second visit was 42 mg./100 ml. At the end of four months she was admitted in acute left ventricular failure. The blood-pressure was 150/140, the radial pulse was impalpable at the wrist, and a gallop rhythm was heard over the praecordium. The urinary findings were unchanged. The blood urea had risen to 118 mg./100 ml. Treatment with mersalyl and digitalis was of no avail and she died two days after admission.

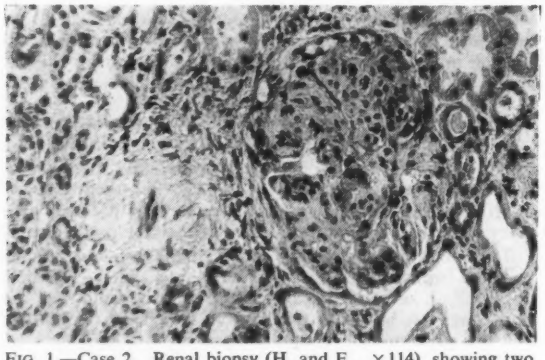

FIG. 1.—Case 2. Renal biopsy (H. and E. ×114), showing two glomeruli, one hyalinized and one with marked capsular adhesions and developing ischaemia. Illness was of nine weeks' duration when the biopsy was taken. Death from hypertensive heart failure occurred five months later.

At necropsy both lungs were oedematous and small pleural effusions were found; the left ventricle was enlarged. The kidneys weighed 150 g. each; the capsules were stripped with difficulty, leaving a finely granular surface. On the cut surface the cortex was slightly reduced. The renal pelves, renal vessels, ureters, and bladder were normal. Histology of the kidney revealed changes similar to those seen on biopsy.

Comment.—Rapidly progressive glomerulonephritis with gross hypertension; death within six months of the onset. Advanced changes of "chronic" nephritis were present on renal biopsy nine weeks after symptoms began.

Case 3

A Muganda boy aged 12 years was admitted to hospital with a history of illness of three months' duration which began with colicky abdominal pain and was followed a day later by swelling of the face and neck. The swelling gradually spread to the rest of the body. Nocturia had occurred three times nightly since the onset. (He had been admitted to hospital with a similar illness nine months previously. Cough and fever had preceded that episode, in which gross oedema and gross albuminuria, with microscopical haematuria and casts in the urinary deposit, had been present. The blood-pressure was 146/98 at that time. Oedema had disappeared by the time of discharge.)

On admission there was considerable oedema and ascites, the blood-pressure was 110/85 and the fundi were normal. Urinalysis revealed heavy albuminuria with moderate microscopical haematuria and hyaline casts in the centrifuged deposit. Urine culture was sterile.

Investigations.—Hb, 58%; R.B.C., 3,500,000/c.mm.; blood film normal; blood urea, 62 mg./100 ml.; blood cholesterol, 447 mg./100 ml.; serum proteins, 3.6 g./100 ml. (albumin 0.4 g., globulin 3.2 g.); electrophoresis revealed the "nephrotic pattern" (Fig. 2). The maximum urine concentration was 1016 and the maximum urea concentration 1.15 g./100 ml. with urea clearance values of 21% and 22%

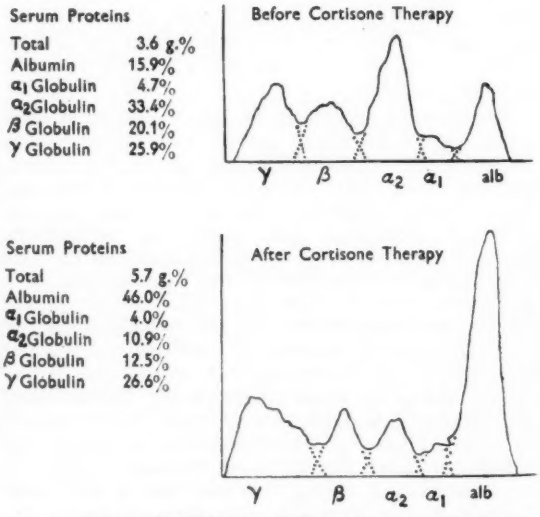

FIG. 2.—Case 3. Electrophoretic pattern of serum proteins before and after steroid therapy.

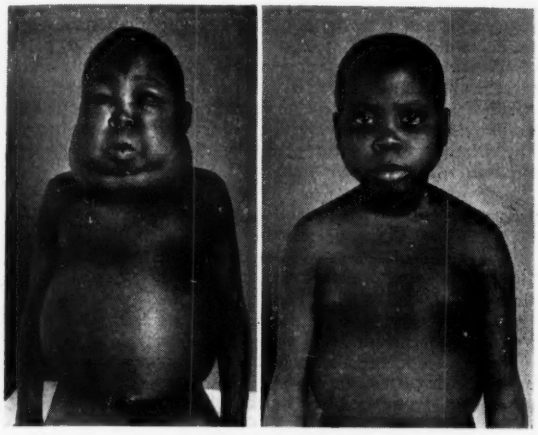

FIG. 3.—Case 3. Before and after steroid therapy.

of normal. Renal biopsy revealed the changes of glomerulonephritis, with advanced scarring of a few of the glomeruli present.

Treatment with bed rest and a high-protein low-salt diet with fluid restriction was instituted. The patient's general condition deteriorated over the first 10 weeks in hospital and gross oedema caused extension of the neck, with difficulty in breathing at times. Tapping of the ascites was necessary. The blood urea rose to 76 mg./100 ml. As the clinical condition continued to deteriorate cortisone, 100 mg. daily, was given for 14 days, and then "tailed off" over the next three weeks. There was a dramatic response to this treatment. Diuresis began 13 days after steroid therapy was begun, and over the period of a week the weight fell from 72 to 48 lb. (32.7 to 21.8 kg.). Two months later, at the time of discharge from hospital, all oedema had disappeared. The blood urea was 19 mg./100 ml.; blood cholesterol, 105 mg./100 ml.; serum proteins, 5.7 g./100 ml. (albumin 2.5 g., globulin 3.2 g.); and the electrophoretic pattern normal. Maximum urine concentration was 1022 and dilution 1002. Maximum urea concentration was 3.46 g./100 ml. with urea clearance 97% and 113% of normal. A second renal biopsy revealed similar changes to the first: 17 of the 24 glomeruli present were normal, four were partially fibrosed, and in three there was considerable scarring.

At follow-up examination three months later the boy had grown, looked well, and was symptom-free (Fig. 3). The blood-pressure was 95/65. Urinalysis revealed slight albuminuria, and slight microscopical haematuria persisted. Laboratory findings were as on discharge from hospital.

Comment.—Glomerulonephritis in a nephrotic phase with excellent response to cortisone therapy.

Case 4

A Munyaruanda girl aged 5 years was admitted to hospital with a history of swelling of the body of 16 days' duration, which began in the face and became generalized within a week of the onset. Fever and sore throat had occurred several days before the swelling appeared. Nocturia had been present since the onset of the illness. The only other sibling had died at the age of 7 years of swelling "similar to this." The diet was poor.

On examination there was considerable generalized oedema, with gross ascites. The B.P. was 100/70 and the fundi were normal. Scattered crepitations were heard throughout both lungs. Urinalysis revealed heavy albuminuria, considerable haematuria, but no casts.

Investigations.—Hb, 80%; R.B.C., 3,800,000/c.mm.; small malignant-tertian malarial parasitaemia, throat swab culture; no beta-haemolytic streptococci; blood urea, 50 mg./100 ml.; blood cholesterol, 500 mg./100 ml.; serum proteins, 4.6 g./100 ml. (albumin 0.7 g., globulin 3.9 g.); electrophoresis of serum proteins (Fig. 4) revealed the "nephrotic pattern." Electrophoresis of urinary proteins revealed albumin together with a small amount of γ-, β-, and α_1-globulin, and a trace of α_2-globulin. Proteinuria, estimated by Esbach's reagent, was 13.5 g./l. Renal biopsy (Fig. 5) revealed changes of acute glomerulonephritis. Appreciable renal damage was present, 8 of the 23 glomeruli in the biopsy being badly affected. There was much haemorrhage in some glomeruli, and one was infarcted.

The child was treated with bed rest and a low-salt high-protein diet. Chloroquine therapy was given to clear the malarial parasitaemia, and two courses of corticotrophin resulted in slight temporary improvement but did not substantially alter the patient's general condition. Albuminuria varied between 3 and 22 g./l. and microscopical haematuria persisted. Small numbers of casts were seen in the centrifuged deposit from time to time. The blood-pressure remained normal during the six months the patient was in hospital and the blood urea rose to 100 mg./100 ml. The blood cholesterol fell to 210 mg./100 ml. Some general improvement occurred in the patient's condition at the end of six months and she was discharged. Since then she has been seen at follow-up on several occasions, the last being 18 months after discharge, when she was reported to have fully recovered.

Comment.—Acute glomerulonephritis; prolonged nephrotic phase.

Glomerulonephritis in Adults

Early or "Acute" Nephritis

These three patients were all young men whose presenting complaint was of swelling of the body. No previous history of similar illness was given, though

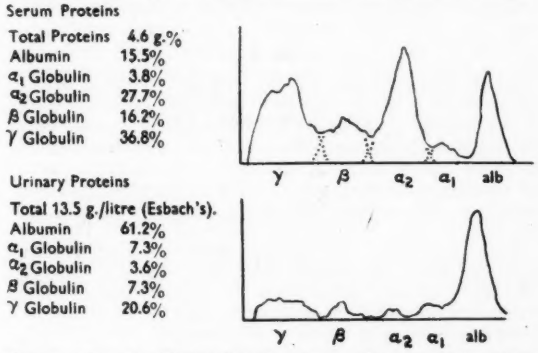

FIG. 4.—Case 4. Electrophoretic pattern of serum and urinary protein.

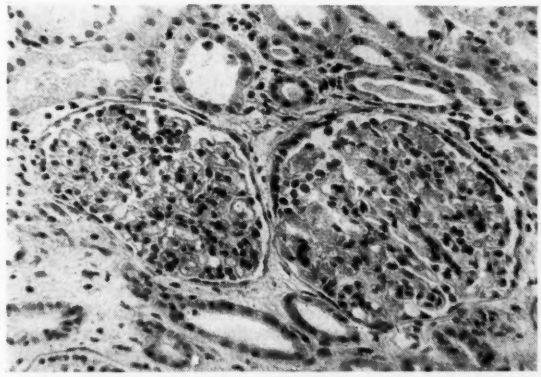

FIG. 5.—Case 4. Renal biopsy (H. and E. ×87), showing acute glomerulonephritis. Note the swelling and cellularity of the glomerular tuft.

there was evidence in one to suggest that renal damage may have dated from an attack of pneumonia a year previously. One patient had had a sore throat and fever a week before the onset of the swelling, but neither of the others gave a history of recent infection. No symptoms of urinary disorder were present, and, in particular, no patient gave a history of passing bloody urine.

Clinical findings on admission included moderate, usually generalized, oedema associated with considerable albuminuria. In two patients the urine was "smoky" on admission and casts were present in the urinary sediment; the blood-pressure was raised in these two cases and linear haemorrhages were present in the fundi of one. In both, the blood urea was raised. Renal biopsy revealed changes of acute glomerulonephritis, and a second biopsy, taken six to eight weeks after the first, revealed in both cases some regression in the histological changes, though in one case digitation of the glomerular tufts suggested that ischaemic change was occurring. Clinically, a moderate improvement took place with bed rest and a low-salt high-protein diet. Oedema, albuminuria, and haematuria lessened and the fundi returned to normal in the patient in whom they had been affected. Hypertension persisted, however, and, though the blood-urea level had fallen, it had not returned to normal by the time of discharge from hospital. The prognosis was therefore guarded. In the third patient (Case 5), who was only mildly, if at all, hypertensive on admission, and in whom microscopical haematuria was slight, the features of the nephrotic syndrome were present. Considerable improvement took place during the three weeks of hospital treatment.

Case 5

A Muganda man aged 27 was well until a month before admission to hospital. He then developed fever and pain on swallowing, which lasted for a few days. A week later the feet and hands began to swell, and later this swelling spread to the abdomen and the face. During this time he felt unwell, and dull aching pain developed in the abdomen and loins. The patient had passed urine twice nightly all his life, and since the onset of the present illness three or four times nightly. There had been no other urinary symptoms and no past history of illness. The diet was fair only, and included, in addition to matoke (banana) and lumonde (sweet potato), meat once weekly and fish once a fortnight. No milk or butter was eaten.

On examination oedema was slight over the face, moderate over the legs, and considerable over the back. A soft apical systolic murmur was heard. The blood-pressure was 155/80 and the fundi were normal. A moderate ascites was present. The bladder, urethra, and prostate were normal, the urine stream was good, and a soft rubber catheter passed easily. There was no residual urine. Urinalysis revealed a heavy cloud of albumin, and in the centrifuged deposit a few red cells, pus cells, and granular casts were seen. Urine culture was sterile.

Investigations.—Hb, 100%; R.B.C., 4,700,000/c.mm.; reticulocytes, 1.0%. Blood film: red cells normal; very occasional malignant-tertian malarial parasites present; platelet count normal; white blood count 16,800, including 9,900 eosinophils; blood urea, 21 mg./100 ml.; serum cholesterol, 410 mg./100 ml. Total plasma protein, 4.3 g. (albumin 0.7 g., globulin 3.6 g.); electrophoresis of serum protein revealed some increase in α_2-globulin while electrophoresis of urinary protein revealed albumin with slight amounts of γ-, β-, and α_1-globulin; only the faintest trace of α_2-globulin developed. Urinary protein, estimated with Esbach's reagent, was 4 g./l. Maximum urine concentration, 1013, dilution 1008. Maximum urea concentration was 0.94 g./100 ml. and urea clearance 71% and 81% of average normal function. Renal biopsy revealed changes of acute glomerulonephritis. The glomerular tufts were cellular and contained moderate numbers of polymorphonuclear leucocytes; recent capsular adhesions were present and a little epithelial proliferation was seen. There was no scarring or arteriolar change. Biopsy culture was sterile. Intravenous pyelography showed nothing abnormal. The chest *x*-ray film, heart-screening, and electrocardiograms were all within normal limits.

Treatment with bed rest and a high-protein low-salt diet was instituted. Two weeks after admission pyrexia of 103° F. (39.4° C.) developed, lasting for eight days. Blood culture was sterile, and white blood count and blood film, throat swab culture, and chest *x*-ray film revealed no abnormality that would account for the pyrexia, which settled after a course of systemic penicillin. While in hospital oedema subsided and only slight swelling of the ankles remained on discharge from hospital. Albuminuria had decreased considerably, slight microscopical haematuria and a few granular casts were still present. The blood-pressure had remained normal throughout.

Comment.—Recent onset of oedema, with features of the "nephrotic syndrome," followed a sore throat. Renal biopsy revealed acute glomerulonephritis. Clinical improvement occurred during three weeks in hospital.

Rapidly Progressive Glomerulonephritis

Three patients fell into this category. Two died in hospital and the third was discharged home eight weeks after admission. His condition on leaving hospital was poor and he did not return for follow-up examination. All three were between 20 and 30 years of age. Symptoms were of short duration and none gave a significant history of previous illness. In two patients extensive oedema had appeared over the course of a few weeks, while the third patient presented in left ventricular failure (Case 6). All were in uraemia and all had a raised blood-pressure. In two cases hypertension was severe and both these patients died from heart failure associated with renal insufficiency. In both cases severe changes in the fundi were present and included papilloedema in one, and a severe retinitis, with many fresh haemorrhages, in the other. In both cases early arteriolar necrosis was seen on renal microscopy. In all three cases some changes of acute nephritis were present in renal biopsy sections.

Case 6

A Munyaruanda man aged 25 had been well until eight weeks before admission to hospital, when he developed breathlessness on exertion. Since then he had woken nearly every night with "something choking him." He had to sit up and wait for the breathlessness, which was associated with a dry cough and palpitations, to subside. These attacks generally lasted half an hour. There were no other symptoms, and, apart from an attack of gonorrhoea in 1951, there was no past history of illness. The diet, which included meat twice weekly, was fairly good.

On examination the patient was orthopnoeic. The pulse was regular, 120 a minute, and rather "hard" in character. The artery wall was normal. The heart was enlarged and a presystolic gallop rhythm, heard best at the apex, was present over most of the praecordium. Some basal rales were heard. There was no jugular congestion and ankle oedema was minimal. The blood-pressure was 170/130 In the fundi, marked arterial change and nipping at the venous crossings were seen and many fresh linear haemorrhages and soft exudates were present. The optic disks were normal. The liver was somewhat enlarged, the urethra and prostate were normal, the urine stream was good. A catheter was passed easily and there was no residual urine. Urinalysis revealed slight albuminuria, and in the centrifuged deposit a few white blood cells, red blood cells, and very

occasional granular casts were seen. Urine culture was sterile.

Investigations.—Hb, 85%; R.B.C., 4,000,000/c.mm.; reticulocytes, 2.9%; white blood count and platelet counts normal; blood urea, 108 mg./100 ml.; blood cholesterol, 223 mg./100 ml.; plasma proteins, 6.5 g./100 ml. (albumin 2.7 g., globulin 3.8 g.); electrophoresis of serum proteins revealed a normal pattern. Renal biopsy revealed very severe renal damage; all the glomeruli were affected and the vast majority showed complete capsular adhesion. All were very ischaemic, but in many a little blood was still passing through the glomeruli and none were totally fibrosed. The glomerular lesions all appeared to be of the same duration. The tubules were dilated and the arteries present showed interstitial thickening. Arteriolar necrosis had occurred. The appearances were those of advanced glomerulonephritis, probably of recent origin. Chest *x*-ray examination revealed a moderate-sized left pleural effusion, and heart-screening showed marked left ventricular enlargement.

Treatment with bed rest, a low-salt diet, liberal fluid intake, digitalis, and mersalyl was instituted. There was no significant response. The blood urea continued to rise and the patient died six weeks after admission to hospital. Six days before death the blood-urea level was 240 mg./100 ml.

Necropsy revealed cardiac enlargement (heart weight 440 g.) with left ventricular hypertrophy. The kidneys were of normal size (157 g. each) and of normal consistency; the capsules stripped with ease, leaving a smooth surface. A very small indentation over the lower pole of the right kidney indicated the position of the renal biopsy. On the cut surface the cortex was a little narrowed; the corticomedullary junction was fairly clear. Histological findings were as described above.

Comment.—Fulminating glomerulonephritis. Death from renal and hypertensive cardiac failure in 14 weeks from the onset of illness.

Subacute Nephritis

One patient admitted with the nephrotic syndrome ran a subacute course. Over a period of several months the blood-pressure rose to hypertensive levels and the blood urea likewise steadily increased.

Latent Nephritis

One patient, a 32-year-old woman, was thought to have glomerulonephritis in a latent phase. Her symptoms of palpitations were thought to be due to extrasystoles. Moderately severe hypertension was associated with cardiac enlargement. Slight changes in the fundi were present. Urinalysis revealed no albuminuria, and virtually no abnormality was seen in the centrifuged deposit. The renal-function tests, blood urea, and serum cholesterol were all likewise normal. Renal biopsy, however, revealed slight but definite changes of glomerulonephritis.

"Intermediate" Nephritis

The first of these three patients had glomerulonephritis, a urethral stricture with secondary infection of the urine, and severe anaemia. A general improvement took place over the course of two months' treatment in hospital. The second patient also had a severe anaemia, thought to have been partly associated with nephritis. In the third, a woman of 40, swelling of the limbs and face had been present intermittently for several years. Albuminuria and microscopical haematuria were present, and a renal biopsy revealed evidence of mild active nephritis.

Chronic Glomerulonephritis

In 10 patients (nine males, one female) a diagnosis of chronic glomerulonephritis was reached. Their ages ranged from 20 to 41 years. Histological material was obtained from needle biopsy of the kidney in eight cases (in two of which post-mortem material was subsequently available), and in the other two cases from necropsy. These patients had been too ill to warrant biopsy.

The diagnosis of chronic nephritis was confirmed histologically in all but one case. In this patient the histological findings were most probably those of chronic nephritis, though chronic pyelonephritis remained a possibility. On the clinical features a diagnosis of chronic nephritis was made.

Congestive heart failure was the commonest mode of presentation in this group and was the reason for admission to hospital in six cases. Two others came to hospital because of generalized swelling, which in one was severe. In one patient recurrent abdominal swelling of three years' duration, due to ascites, was the only complaint. The remaining patient complained of severe headache and deterioration of vision.

The history revealed that two patients had been in Mulago Hospital with a similar illness 5 and 18 months previously, while another had attended the out-patient department with oedema and albuminuria two years before the present admission. The only female patient had been oedematous with both the second and third pregnancies, and in both cases the baby had been stillborn. In this last pregnancy an illness had occurred which from the patient's description was probably heart failure. The first pregnancy had been uneventful. Four male patients gave a history of gonorrhoea between 7 and 15 years previously, but no late effects of this disease were found and none of the patients had urethral strictures. The dietary history generally revealed that a fairly good diet was taken.

Oedema was usually slight to moderate in degree and, with congestive heart failure, dependent in distribution. In two cases oedema was virtually absent, while in one it was severe and generalized. Swelling of the face was present intermittently in several patients. Swelling of the abdomen, due to ascites, occurred when oedema was severe. In one patient it was the only complaint and was present in the absence of oedema. In this patient the blood-pressure was within normal limits, but in all the others it was raised, and in four the diastolic pressure was 150 mm. Hg. A severe retinitis was present in patients whose diastolic pressure was 130 mm. Hg or over. In those patients whose diastolic pressure was below 130 mm. Hg retinitis was absent, though narrowing and tortuosity of the arteries with increase of the light reflex was often seen. Two patients had papilloedema, and the diastolic blood-pressure in both cases was 150 mm. Hg or over.

There was clinical and radiological evidence of left ventricular enlargement, and electrocardiographic evidence of left ventricular strain in all except the patient in whom the blood-pressure was normal. A moderate degree of albuminuria was a constant occurrence. Microscopical haematuria was also always present, though in most cases it was slight. Pus cells were usually less than 5 per c.mm. A few granular and hyaline casts were generally seen in the centrifuged deposit. From each patient several urine cultures were performed, and were repeatedly sterile, except in two from whom organisms thought to be contaminants were grown. In both these cases few pus cells were present in the centrifuged deposit and subsequent urine cultures were sterile. Cultures taken from the renal-biopsy needle were sterile in all cases.

Anaemia was a common finding, the haemoglobin varying between 22% and 83%. Some degree of

azotaemia was present in all patients; in four the blood urea was over 150 mg./100 ml. Urine concentration and dilution tests nearly always revealed gross impairment of renal function, and urea concentration and clearance tests showed similar results.

Histological studies of the kidney revealed considerable damage in all. In most cases many glomeruli were totally scarred while others showed varying degrees of ischaemic change. Capsular adhesions were common and arteriosclerosis was often seen. Secondary tubular degeneration was usually present.

Total serum protein levels ranged from 5 to 6.2 g./100 ml.; the average was 5.5 g. Serum albumin levels varied between 0.6 and 2.3 g. (average 1.7 g.), and serum globulin from 2.8 to 5.2 g. (average 3.8 g.). The electrophoretic pattern of the serum proteins was studied in seven cases. Apart from hypoalbuminaemia, two were normal, in four there was some increase in γ-globulin, and in the remaining case the "nephrotic" pattern was present.

The length of time patients were under observation varied from three days to a year, but with previous admissions to Mulago Hospital this period of observation was up to three years in duration. Four patients died during the study period, and all came to necropsy. In three who had been under observation for several months the illnesses had been clinically similar, and death was in all cases due to hypertensive heart failure associated with uraemia (see Case 7). The fourth patient, who was suffering from malignant hypertension, died shortly after admission from an intracerebral haemorrhage.

Of the six remaining patients, one, the only female patient with chronic nephritis, suffered from heart failure and renal insufficiency, and the blood urea rose from 153 to 204 mg./100 ml. during three weeks in hospital. Two others made a good recovery from hypertensive heart failure, but, in one, failure had already recurred at a follow-up examination three weeks after discharge. A fourth, who complained of severe headache and failing vision, suffered from malignant hypertension (B.P. 240/160). The blood-urea level rose from 59 to 157 mg./100 ml. during six weeks' observation.

In the remaining two cases the disease progressed more slowly. In one the only complaint was a recurrent ascites, which had been present for three years. The blood-urea level remained between 150 and 160 mg./100 ml. during the nine weeks of hospital treatment. The blood-pressure was within normal limits and no deterioration occurred in his general condition while under observation. The remaining patient, aged 22, was discharged from hospital with a high blood-pressure, albuminuria, and raised blood urea. Three years later his condition was unchanged.

Case 7

A Munyaruanda man aged 20 was admitted to hospital with congestive heart failure. He had been in hospital three months previously with a similar illness, and findings at that time had included: B.P. 150/125, pulsus alternans, cardiac enlargement, gallop rhythm, jugular venous congestion, oedema, ascites, albuminuria, and a few casts in the urinary deposit. A moderate response to bed rest, digitalis, and mersalyl therapy had occurred. On discharge the B.P. was 160/110.

The findings at the present admission were similar to the previous ones; the blood-pressure, however, had fallen to 120/95. The fundi were normal.

Investigations.—Hb, 70%; R.B.C., 4,200,000/c.mm.; small malignant-tertian malarial parasitaemia; blood urea, 44 mg./100 ml.; blood cholesterol, 166 mg./100 ml.; serum proteins, 5.9 g./100 ml. (albumin 1.2 g., globulin 4.7 g.). The maximum urine concentration was 1010. No renal biopsy was taken, as the patient was uncooperative. Chest *x*-ray examination revealed an increase in the transverse diameter of the heart, and on fluoroscopy left ventricular enlargement was noted. The electrocardiogram revealed left ventricular strain.

A slight initial response to treatment with bed rest, digitalis, and mercurial diuretics was followed by a gradual deterioration over the course of several weeks, during which time the blood urea rose steadily to 210 mg./100 ml.; pericardial friction developed. The patient died seven weeks after admission.

At necropsy the heart weighed 460 g. and there was left ventricular enlargement. The kidneys weighed 110 g. each, the capsules were lightly adherent, and the surface of the kidneys was finely granular. Microscopy revealed a large number of totally scarred glomeruli uniformly distributed throughout the kidney substance. The appearances were those of chronic glomerulonephritis (Fig. 6).

Comment.—Chronic glomerulonephritis with hypertensive heart failure; terminal renal insufficiency.

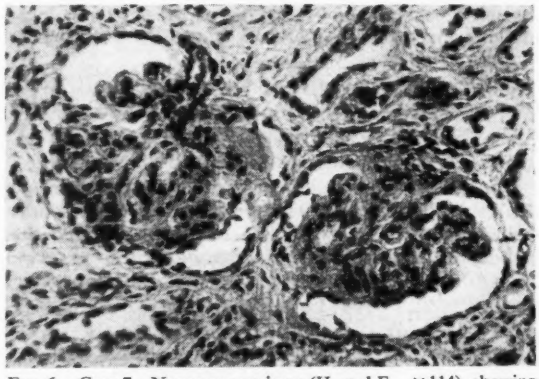

FIG. 6.—Case 7. Necropsy specimen (H. and E. ×114), showing chronic glomerulonephritis. Two ischaemic adherent cellular glomeruli are present. The patient, a youth aged 20, died from hypertensive heart failure with renal insufficiency.

Discussion

Gelfand (1957) stated that "the acute form of glomerulonephritis [in the Bantu] is not altogether rare, though possibly less frequent than in the European," and that in most cases there was haematuria visible to the naked eye. He suggested, however, that haematuria was so often due to bilharzia that its value as a sign of acute nephritis was diminished. Gelfand also found subacute or nephrotic nephritis to be an "extraordinarily common and serious form of nephritis." Furman (1955) analysed the records of 220 cases of nephritis in Bantu subjects and, "using the criteria of Ellis (1942)," classified the cases into Types I and II. He found 68% were Type I and 32% were Type II. Type I cases, however, were characterized by absence of macroscopic haematuria and by a prolonged oedematous phase lasting up to three to four months. Under these circumstances the division of cases into the two types must have been difficult, particularly as it was stated that, "the clinical picture of these patients [with Type I nephritis], often several weeks after the onset of

the illness, is superficially similar to that of a patient with Type II nephritis." Type I nephritis was a disease of childhood and adult life, while Type II was a disease predominantly of young adults.

In Uganda it would appear that glomerulonephritis in the Bantu is also a disease of the younger age-groups. Of the 33 patients described the eldest was 41 years old. This youthful distribution was not entirely due to the tendency for young people to be admitted to hospital in Uganda. In Fig. 7 is shown the age distribution of the whole group of 67 patients with various forms of renal disease or hypertension from which the present series was drawn. It is seen that glomerulonephritis occupies most of the younger half of the series, and in fact was present in 32 out of 48 patients up to the age of 40 years. Above this age only one out of 19 patients was shown to have glomerulonephritis.

No sex distribution was evident that could not be accounted for by the different proportion of males and females admitted to medical wards in Kampala, and no particular tribal distribution was noted.

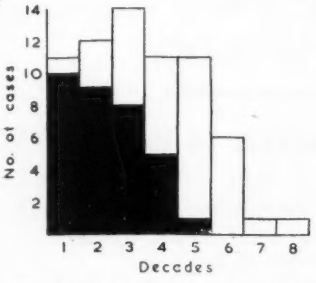

FIG. 7.—Incidence of glomerulonephritis in 67 patients with various forms of renal disease and hypertension.

In the 12 children with glomerulonephritis a characteristic pattern emerged. The dominant clinical features were oedema and albuminuria which, together with the finding of hypercholesterolaemia and hypoalbuminaemia, constituted the features of the nephrotic syndrome. The electrophoretic pattern of the serum proteins, moreover, with increase in α_2 and β-globulin fractions, with a decrease in albumin and sometimes of γ-globulin, was that described as occurring in the nephrotic syndrome in children (Stickler, Burke, and McKenzie, 1954). (That the proportion of albumin in the urinary protein was relatively low was attributable to the very low levels of serum albumin (MacInnes and Longsworth, 1939; Luetscher, 1940).)

On the other hand, hypertension was usually present, and in some cases (generally those in which advanced histological changes were present in the kidney) was sometimes severe. Microscopical haematuria was invariable and the blood urea was generally slightly raised. Moreover, the histological features were, in varying degrees, those associated with Type I nephritis (Ellis, 1942), though in some cases chronic changes were present. The overall pattern of the disease in these children was therefore fairly uniform and contained features of both Ellis types of nephritis. In our present state of imperfect knowledge it would perhaps be wise to refer to the illness simply as "oedematous glomerulonephritis." The prognosis, however, appeared to be more closely akin to that of Ellis Type II nephritis than to Ellis Type I, as in the short time of study one of these children died, several relapsed, while in others the degree of histological change as seen from renal biopsy left little doubt about the ultimate fatal outcome of the disease.

The aetiology of the disease is not clear. Nephritis in the tropics has been attributed by several workers to malarial infection (Manson-Bahr and Maybury, 1927; Goldie, 1930; Giglioli, 1932; Carothers, 1934; James 1939), the quartan malarial parasite being usually held responsible. Carothers (1934) found 10 out of 15 children with nephritis to have a quartan-malaria parasitaemia, whereas in only 18 out of 217 children without nephritis was quartan parasitaemia demonstrated. Carothers felt that, "in so far as one could judge from the limited number of cases, it would appear probable that quartan malaria might be a factor in the causation of nephritis." The cases described by these various authors do not form a very homogeneous pattern, and it is not surprising, after all, that malaria and nephritis should co-exist in tropical countries. Raper (1953) has pointed out that the pathological findings in the five cases described by Giglioli (1932) as being characteristic of malarial nephritis were, in three of the cases, those of chronic (probably pyelo-) nephritis, and Raper felt that the photomicrographs in two of these cases confirmed this opinion.

In the present series, malarial parasitaemia was present in 6 of the 12 children with glomerulonephritis. This would not be an unusual finding in a similar group of children in hospital in Kampala without nephritis, in whom the blood was searched periodically over a period of many weeks. The majority, moreover, were of malignant tertian malaria, which is the usual malarial infection in the district. Treatment of the parasitaemia with chloroquine did not result in improvement in the state of the nephritis. James (1939), however, stated that malarial nephritis responded well to treatment with antimalarial agents. It therefore seemed that, apart from its general effect as a chronic infective state, malaria was not aetiologically connected with the nephritis from which these children suffered.

In seven of the children there was a history of recent infection, usually of the upper respiratory tract, and in four this had occurred within 11 days of the onset of oedema. Haemolytic streptococci were not isolated from the throat swab in these patients, though attempts were made to do so in some cases. Haemolytic streptococcal infections are said to be very uncommon among Africans in tropical Africa. Davies (1947), from post-mortem studies in Uganda, found that most pyogenic infections were due to the pneumococcus or staphylococcus. The rarity of acute rheumatism, chorea, and rheumatic nodules has been mentioned by Donnison (1928) and Williams (1939) from East Africa, and by Jelliffe and Reed (1953) from Nigeria. The latter authors isolated beta-haemolytic streptococci from the throats of only 0.9% of schoolchildren between the ages of 4 and 18 years, a carrier rate which appeared to the authors to be significantly lower than that found in most temperate regions. However, though it is possible that haemolytic streptococcal infections are relatively uncommon among Africans in Uganda they are certainly seen, from time to time, in hospital practice, and chronic rheumatic heart disease is by no means uncommon (Shaper and Shaper, 1958). It seems possible, therefore, that the infection which these children developed before the onset of nephritis may have been, in fact, streptococcal, and that nephritis in Uganda may be aetiologically connected with the streptococcus as it is in Europe.

The extreme degrees of oedema seen in some of the patients (especially the children with glomerulonephritis) were thought to be associated with gross hypoalbuminaemia. The cause of this was partly albuminuria, which was usually heavy (in one child, loss of urinary protein reached a level of 22 g./litre at a time when the serum albumin level was 0.49%). In some patients the serum albumin level continued to fall after admission to hospital, presumably because the patients were admitted early in the course of their illness before the drain of albumin in their urine had fully depleted the serum protein level. Another factor in the development of gross oedema may have been that the serum protein levels of even apparently healthy Africans in Uganda are different from European normals (Holmes, Stanier, Semambo, and Jones, 1951), the albumin levels being lower and the globulin levels higher than in Europeans. The serum albumin levels in these patients, especially in the children, were therefore probably low before the urinary loss began.

Summary

Thirty-three African patients suffering from glomerulonephritis were studied. In all but the youngest cases the diagnosis was confirmed by renal biopsy.

The 12 children in the series presented with massive oedema and ascites associated with heavy albuminuria. Haematuria was only microscopical. A rise in blood-pressure was common. The serum albumin level was constantly low and the serum cholesterol usually raised. Electrophoresis of serum protein characteristically revealed a "nephrotic" pattern. Some rise in the blood-urea level was common in the early stages of the illness. Changes of acute nephritis were generally seen on renal biopsy, though in three out of eight cases in which this was done chronic nephritis was present. The illness ran a protracted course, abruptly curtailed in one case by steroid therapy. The overall prognosis appeared to be poor.

Renal biopsy revealed acute nephritis in 6 of the 21 adult patients. One presented with the nephrotic syndrome and made an apparently good recovery. In two others with a raised blood-pressure, macroscopic haematuria, and a raised blood urea, some improvement took place in hospital. In the remaining three the disease was rapidly progressive, two dying in hospital. Severe hypertension, retinopathy, renal insufficiency, and heart failure were characteristic of these cases in which severe changes of recent origin were present on renal biopsy.

Chronic nephritis was present in 10 cases, and in these hypertensive heart failure was the commonest mode of presentation. Advanced retinopathy was usual in the presence of severe hypertension. The blood urea was raised in all cases, and in four patients who died while under observation death was due to heart failure associated with insufficiency.

I wish to acknowledge the constant help and encouragement I received from Professor A. W. Williams, of Makerere College, in whose department this study was made. My thanks are also due to Professor J. N. P. Davies, of Makerere College, and Professor T. F. Hewer, of Bristol University, for assistance in the interpretation of histological specimens; and to Professor C. Bruce Perry, of Bristol University, for advice in the preparation of the paper. J. Kyobe, of Makerere College, acted as interpreter throughout the study and gave much technical assistance; and Miss J. Summerscales, of the Uganda Medical Service, carried out the electrophoretic studies. Photomicrographs were prepared by Mr. D. N. White, of Bristol.

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ACUTE APPENDICITIS IN PREGNANCY

BY

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Acute appendicitis in pregnancy is a subject about which much has been written in American journals but which has had little attention in British literature. The incidence is between 0.5 and 1 per 1,000 pregnancies, and mismanagement of this condition carries a significant maternal mortality.

The diagnosis of appendicitis is frequently difficult in the pregnant, as in the very young, the very old, and the obese. Particularly in pregnancy is the early diagnosis most important, because the mortality of appendicitis complicating pregnancy and the puerperium is the mortality of delay.

Of the 25 cases of acute appendicitis in pregnancy here presented, 10 occurred in Glasgow Royal Maternity and Women's Hospital between 1942 and 1953 (an incidence of 0.26 per 1,000 births), 3 occurred in Eastern District Hospital, Glasgow (an incidence of 1.4 per 1,000 births), and 8 were treated in the Maternity Hospital at Leeds between 1948 and 1959 (an incidence of 0.36 per 1,000 births). Four were treated in the general surgical wards of Glasgow Royal Infirmary.

From the literature 348 cases of appendicitis in pregnancy were collected, giving a total of 373 cases, including the present series.

Incidence of Acute Appendicitis

In acute appendicitis in general, two-thirds of cases occur between 11 and 30 years of age, and two-thirds are male (Tashiro and Zinninger, 1946). One-third of the male patients have perforative appendicitis, compared with one-fifth of the females. Three-quarters of all cases of so-called chronic appendicitis occur between 11 and 30 years of age, and two-thirds of these are females (Shelley, 1938). Appendicitis, therefore, is

a less severe condition in women, resulting in fewer and less advanced cases of acute appendicitis and more cases of chronic appendicitis of doubtful significance. The incidence of pregnancy among women with acute appendicitis is about 2% (Baer *et al.*, 1932).

Acute appendicitis in pregnancy occurs most often in nulliparae and primiparae under 30 years of age, probably as the result of the age incidence of acute appendicitis in general. In the present series 18 patients were under 30 years of age and 16 were in their first or second pregnancy.

Duration of Pregnancy

Whereas the stage of pregnancy affects the appendix because of the elevation of the caecum and appendix caused by the enlarging uterus (Baer *et al.*, 1932), it does not affect the incidence of appendicitis in pregnancy, which is approximately the same in each trimester. The distribution of the total cases according to trimester is shown in Table I, 35.1% occurring in the first trimester, 33.9% in the second, and 30.9% in the third trimester and the puerperium.

TABLE I.—*Stage of Pregnancy*

	Present Series	Literature	Total	Percentage	
First trimester ..	2	122	124	35·1	
Second ,, ..	13	107	120	33·9	
Third ,, ..	6	89	95	26·9	30·9
Labour	2	4	6	1·7	
Puerperium ..	2	6	8	2·3	
Total ..	25	328	353		

In 20 cases from literature no maturity was given.

TABLE II.—*Maternal Mortality*

	Present Series	Literature	Total	No. of Cases	Mortality (%)	
First trimester ..	—	—	—	132	0	1·9
Second ,, ..	—	5	5	126	3·9	
Third ,, ..	—	11	11	101	10·9	11·2
Labour	1	—	1	6	16·7	
Puerperium ..	—	—	—	8	0	
Total ..	1	16	17		4·6	
Cases ..	25	348		373		

The stage of pregnancy does affect the severity of the appendicitis. In Table II the maternal mortality is calculated for each trimester. No maternal death occurred in the first trimester, but the maternal mortality is 3.9% in the second, 10.9% in the third, 16.7% intrapartum, and nil in the puerperium. The maternal mortality for the first two trimesters is 1.9%, which has to be compared with the maternal mortality of 10.9% in the third trimester and a mortality rate for acute appendicitis in general of approximately 1% (Aird, 1957). One maternal death occurred in the present series.

The increasing maturity of the pregnancy adversely affects the severity of the appendicitis in three ways. First, the upward displacement of the appendix in pregnancy takes it out of the pelvis into the general peritoneal cavity, where localization of any infection is less likely. The enlarged uterus prevents the omentum from gaining satisfactory and unrestricted access to the site of the infection. The Braxton Hicks contractions of the neighbouring uterus prevent the infection from being quickly localized by the formation of adhesions, and the general increase in vascularity of the abdomen, with a consequent increase in the amount and rate of lymphatic drainage, results in a more rapid progress of the inflammation.

Secondly, the upward migration of the appendix may be lessened or prevented by periappendicular adhesions, low attachment of the caecum, or a retrocaecal appendix. Hoffman and Suzuki (1954) showed that the mobility of the appendix as noted at operation has a direct influence on the severity of the appendicitis, the retrocaecal appendices and those fixed by adhesions resulting in more severe infection. A previous attack of appendicitis resulting in adhesions is therefore an adverse factor in cases of appendicitis in pregnancy. When the diagnosis of appendicitis has been made in a female, appendicectomy should be performed. Subsequent appendicectomy should be carefully considered for a patient who has had appendicitis which was not treated by operation in the first instance, because the risk of such an operation is negligible and the risk of any flare-up of appendicitis in a subsequent pregnancy is removed.

Thirdly, the diagnosis of acute appendicitis becomes more difficult as pregnancy approaches term. If the diagnosis is delayed, and perforation and peritonitis follow, the prognosis is made worse by a concomitant pregnancy. There is a high circulatory level of adrenocorticoids in pregnancy which tends to diminish the tissue response to inflammation and so mask the early signs of infection and hinder localization. There is also a general atony of visceral smooth muscle which may cause a diminished reaction of the appendicular muscle coat to infection with a less severe midgut colic of slower onset.

Foetal Loss

The foetal loss in acute appendicitis in pregnancy is considerable, and Table III shows the foetal loss for the series where details are available. The foetal mortality rate was 12.5% for the first trimester, 15.7% for the second, and 20% for the third, with an overall foetal loss of 17%. Premature interruption of pregnancy becomes more frequent as the severity of the appendicitis increases and the nearer the patient is to term, the severity of the appendicitis being more important than the maturity of the pregnancy. Abortion and premature labour themselves have little adverse effect on the maternal prognosis. In the present series, five patients aborted and four had premature labours, three infants dying in the neonatal period. This is a foetal loss of 8 in 22 pregnancies (36.4%), since three patients have to be excluded because two developed appendicitis in the puerperium and in one patient the result of the pregnancy is not known.

TABLE III.—*Foetal Loss*

	Present Series	Literature	Total	Mortality (%)	
First trimester ..	1	7	8	12·5	13·9
Second ,, ..	4	4	8	15·7	
Third ,, ..	3	9	12	20	
Total ..	8	45	53	17	

Diagnosis

The symptoms of acute appendicitis are the same in the gravid as in the non-gravid. Smith and Bartlett (1940) found the commonest and earliest symptoms to be abdominal pain and the commonest sign to be local tenderness over the appendix. Vomiting occurring after the fifth lunar month requires careful investigation.

Physical findings may be minimal after the first trimester, so that the diagnosis becomes progressively more difficult near term. As pregnancy advances, the pain is situated higher and more laterally in the abdomen. In the first three months the clinical picture is no different from the non-gravid, but the elevation of the appendix, which usually occurs thereafter, is associated with a masking of the signs of muscle rigidity, rebound tenderness, psoas spasms, and maximal tenderness in the iliac fossa as elicited by rectal and vaginal examination. Abdominal examination is equivocal in many cases, particularly in the later months. McDonald (1929) stressed the significance of nausea and vomiting associated with pain, fever, and local tenderness.

The patient's temperature is of little help, the absence of any marked pyrexia being in keeping with appendicitis, whereas a rising pulse rate is of importance. The white-blood-cell count in pregnancy is normally 8,700 to 15,500/c.mm. (Priddle and Hesseltine, 1951), and the erythrocyte sedimentation rate is normally raised, with an average of 36 mm. (Westergren) at one hour in cases at term (Hamilton, 1953). Meharg and Loop (1953) placed little value on the white-cell count in cases of appendicitis, and Parker (1954) regarded only a high white-cell count to be significant.

Examination of the urine is important to differentiate pyelitis from appendicitis. In the early stages of pyelitis the urine may be quite clear microscopically despite suggestive symptoms, and elevation of the foot of the patient's bed may be helpful in allowing the flow of urine from the affected atonic ureter to improve. Only a catheter specimen of urine with a large number of pus cells present is an adequate pointer to pyelitis where the diagnosis is in doubt.

In the present series the most important diagnostic factor was the history given by the patient, though the duration of the history did not always coincide with the severity of the appendicitis at operation. White-blood-cell counts of 19,000/c.mm. were associated with appendicitis with perforation and peritonitis, but were not important in the diagnosis.

Treatment

The pregnant woman with acute appendicitis is first a surgical problem and secondly an obstetric problem. During the first two trimesters early diagnosis and immediate appendicectomy are the best treatment, the uterus being manipulated as little as possible during the operation, which should be performed rapidly. After operation every effort should be made to prevent abortion and premature labour by combating dehydration, acidosis, and abdominal infection. A carefully performed abdominal operation not involving the uterus should not cause abortion or premature labour, and removal of an acutely inflamed appendix in pregnancy will diminish the risk of pregnancy otherwise terminating prematurely.

When acute appendicitis is diagnosed in the last trimester, most authorities favour appendicectomy alone and leave the pregnancy to take its own course. Lower-segment caesarean section followed by appendicectomy may allow rapid delivery of the infant, reduction of the time of exposure of the infant to toxaemia, and easier access to the appendix, but it increases the danger of widespread infection of the uterine cavity and reduces the resistance of the peritoneum by additional trauma. Indeed, the removal of an appendix at the time of caesarean section, of hysterectomy, or of removal of an ectopic pregnancy increases the operative risk. If the patient is in labour at the time of diagnosis, and vaginal delivery can be achieved without much delay, this is by far the best management, the appendix being removed immediately afterwards.

With a patient in early labour without obstetric reasons for abdominal delivery, in whose case it is considered unwise to await vaginal delivery before performing appendicectomy because a long labour is expected, the decision on caesarean section at the time of appendicectomy would have to be made on the merits of the individual case. In this country, to-day, lower-uterine-segment caesarean section is the operation of choice, should abdominal delivery be advisable at the same time as appendicectomy. Theoretically the best procedure would be extraperitoneal caesarean section followed by appendicectomy through an incision over the appendix. However, this would be a longer and more difficult procedure, and should the peritoneum be punctured during the extraperitoneal approach to the uterus the risk of spread of infection would be increased.

In 24 of the 25 cases reported, appendicectomy was performed without other surgical procedure, apart from drainage of the peritoneal cavity, which was decided on accepted surgical principles. In one case a localized appendix abscess was drained without removal of the appendix, this being eventually removed some months after delivery. The fatal case is presented in more detail.

Case 6.—A para-3 aged 28 was admitted in labour with a five-day history of diarrhoea followed by vomiting and upper abdominal pain prior to the onset of labour. On the third day of symptoms the pain became localized in the right iliac fossa. A spontaneous vertex delivery lasting six and a half hours occurred on the fifth day of symptoms and was followed by a marked increase in the severity of the pain in the right iliac fossa. Laparotomy on the sixth day of symptoms revealed a ruptured retrocaecal appendix, acutely inflamed and gangrenous, with generalized peritonitis. The patient died next day despite penicillin and intravenous fluids. During the course of her illness she had a very rapid pulse, rising to 160 a minute, and her temperature on admission was 100.4° F. (38° C.), rising to 102° F. (38.9° C.). Her urine remained microscopically and bacteriologically sterile.

Summary

A series of 25 cases of acute appendicitis in pregnancy are reported. One maternal death occurred, and there were five abortions and four premature labours with three neonatal deaths. Twenty-four cases were treated by appendicectomy, one by drainage of an appendix abscess.

From the literature 348 cases of acute appendicitis in pregnancy were collected. From a study of the total 373 cases the figures shown in Tables I to III were obtained.

Diagnosis, prognosis, and treatment of acute appendicitis are discussed and the following points noted. (1) Appendicitis appears to be no more frequent in pregnancy than otherwise, being commonest under 30 years of age, during the first and second pregnancies, and arising with about equal incidence in each trimester. (2) The condition in general is no more severe in pregnancy than otherwise, unless the diagnosis is delayed, when the inflammation is more acute and less well localized because of pregnancy. The diagnosis is

more difficult the nearer the patient is to term; consequently the risk to the patient is greater near term. (3) The foetal mortality is related to the severity of the appendicitis rather than to the duration of the pregnancy. Abortion or premature labour has little adverse effect on the maternal prognosis. (4) Previous appendicitis with adhesions will adversely affect the prognosis of subsequent appendicular inflammation in pregnancy. When appendicitis is diagnosed in a woman the appendix should be removed. (5) The treatment of choice is appendicectomy, without interference with the pregnancy.

I thank my consultant colleagues for their permission to refer to the case-records of their patients, and for the help and advice of Sir Andrew Claye and Miss U. M. Lister in the preparation of this article.

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A NEW MASK FOR DELIVERING OXYGEN OR OTHER GASES

BY

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The M.C. mask, described below, differs from other masks in that, by virtue of its shape and volume, a valve effect is obtained without the presence of a mechanical valve. Thus there is no rebreathing of carbon dioxide, and a cone of inflowing gas is delivered direct to the region of the patient's nostrils or mouth. The concentration of the inflowing gas can be regulated by the rate of flow from the delivery cylinder. A flow of 2 litres of oxygen a minute gives an average concentration of 35%.

The mask is comfortable, very portable, and does not interfere unduly with talking. It is suitable for the conscious or the unconscious patient and can be worn in the sitting or lying position. As it is made in a cup shape of semi-rigid plastic, it can be held to the face by ambulatory patients who require oxygen quickly for the making of some effort. It is suitable for the administration of other gases—for example, self-administered anaesthesia in labour. It is so constructed as to avoid the disadvantages of the polymask described in a previous paper (Catterall and Snow, 1960).

The mask is worn as shown in the diagram, and the main part of it consists of a cup-shaped member of semi-rigid plastic through the centre of which runs the gas-delivery tube of the same material. The inner end of this extends to a point in the same plane as the rim of the cup-shaped member, which is in contact with the

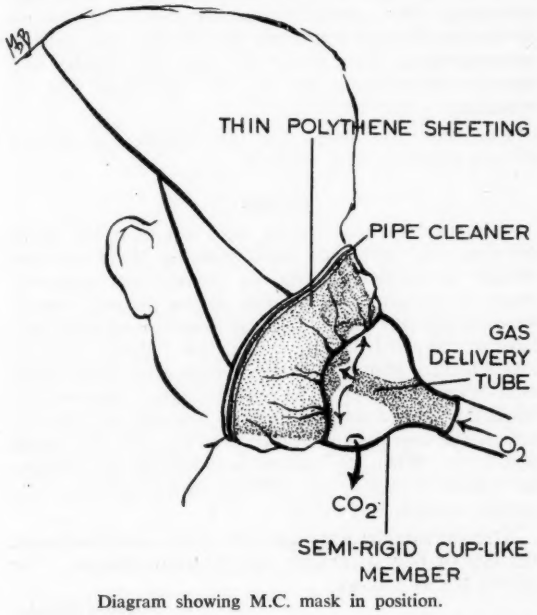

Diagram showing M.C. mask in position.

nose and the chin. It is therefore in close proximity with the patient's upper lip, to which the inflowing gas is directed. The outer end of the gas-delivery tube extends sufficiently beyond the dome of the cup-shaped member to attach to it the supply tubing from the gas cylinder.

The sides of the rim are made deeper than the parts which touch the nose and the chin to provide more stability when the mask is worn.

A small hole is situated in the cup-shaped member about halfway between the rim and the gas-delivery tube; this is for the emergence of expired carbon dioxide and, at low rates of flow, for the inspiration of room air.

The cup-shaped member is kept in place by a skirt of thin plastic sheeting in the hem of which is a pipe cleaner. This is moulded over the bridge of the nose and the cheeks and beneath the chin. The covering of cotton fibres prevents any cutting in of the wire to the skin. Adjustable straps around the head fix the mask in position.

Principle of the M.C. Mask

The inflowing gas is delivered very close to the upper lip, which it strikes, and is deflected upwards to the nostrils and downwards to the mouth. In addition to this, on inhalation the inflowing gas is drawn towards the mouth or nostrils. Thus a central cone is produced which contains a high concentration of the inflowing gas. Around this, the atmosphere within the cup-shaped member contains smaller concentrations of the gas, until at the periphery, immediately proximal to the hole

for expiration, approximately room air is present. Obviously, if the rate of oxygen flow is only 2 litres a minute and the subject has a minute-volume of 8 litres, room air will be drawn in also and will dilute the 2 litres of 100% oxygen, giving an inspired atmosphere of 40% oxygen.

Since the volume of the mask is so small, and its walls are semi-rigid, a dead space is not built up, all the air inside the mask being in a constant state of organized movement. The pattern of this movement is dominated by the fact that the end of the gas-delivery tube reaches up to the plane of the rim of the semi-rigid member and thereby delivers the gas to the immediate site of inhalation.

The mask was tested for the oxygen and carbon dioxide concentrations inside it.

Results

Values for carbon dioxide were less than 1% in all samples, and with prolonged wearing there was no further accumulation and no rebreathing occurred. Tests for oxygen concentration at the patient's mouth were carried out on 21 different wearers and with flow rates of oxygen from the cylinder of 2 litres a minute and 4 litres a minute. Analyses were made by a Beckman oxygen analyser. The results obtained showed that when the oxygen was leaving the cylinder at 2 litres a minute the average concentration at the patient's mouth was 35%. When the oxygen was leaving the cylinder at 4 litres a minute the average concentration at the patient's mouth was 48%.

Alveolar samples were analysed in the same way when the rate of flow of oxygen was 4 litres a minute. The results are as follows:

Time of Administration	Oxygen in Alveolar Sample
5 minutes	28%
10 "	30%
15 "	34%
30 "	35%

Summary and Conclusions

A new mask for delivering oxygen or other gases is described in which there is a valve effect within the mask though no mechanical valve is present. The inflowing gas forms a cone of high concentration, and the expired gas is blown outside this cone to the periphery of the mask.

There is no measurable rise in carbon-dioxide concentration with a flow of 2 litres of gas a minute, because the small volume of the mask prevents the formation of a dead space and therefore prevents rebreathing. The shape of the mask and the position of the end of the gas-delivery tube ensure that there is a continuous and organized movement of the gases inside the mask.

The effective delivery of oxygen to the patient at low flow rates is important, especially in domiciliary practice where economy of oxygen is essential. It is generally agreed that an oxygen concentration of 30–40% in the inspired air will fully saturate the arterial blood in most cases. The results obtained with the M.C. mask show that its size and design enable such an oxygen concentration to be delivered to most patients with a flow of oxygen from the cylinder of 2 litres a minute.

A patent application for this mask has been filed and the rights are being assigned to the National Research Development Corporation, to whom inquiries should be addressed.

My thanks are due to Mr. Michael Snow for his great help in taking the gas samples and analysing them. I also thank Miss Mary Brown for the diagram.

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Medical Memoranda

"Vacuum Cleaner Injury" of the Penis

Many forms of penile injury have been described after attempts to induce erotic stimulation. Strangulation by rubber bands, metal rings, and string are the commonest, producing oedema and sometimes even retention of urine and gangrene. Three patients with similar penile injuries produced by a vacuum cleaner are here described.

CASE HISTORIES

Case 1.—A widower aged 57 attended hospital on October 17, 1957, because of penile lacerations. He had been greatly incapacitated for a number of years with chronic bronchitis and emphysema. Returning from having a few drinks in a public-house and seeking erotic satisfaction, he introduced his penis into the end of a vacuum cleaner tube and switched on the machine. However, pain soon caused him to stop, and then he found his penis was congested and bleeding. On examination the glans penis was extensively lacerated, the lacerations appearing almost "explosive" in nature. The urethra was not involved. The lacerations were sutured with catgut, and a soft rubber catheter was introduced for several days. Recovery was uneventful.

Case 2.—A 28-year-old bachelor attended hospital on September 11, 1957, with similar extensive lacerations of the glans penis extending into the external urethral meatus. The prepuce was also lacerated. He had produced the injuries in exactly the same manner as the previous patient. Circumcision was performed, the lacerations of the glans were sutured with catgut, and a self-retaining urethral catheter was introduced. Healing was satisfactory without any sign of stricture.

Case 3.—A widower aged 75 attended hospital on August 7, 1959, in great mental distress and complaining of pain, swelling, and laceration of the penis. He stated that while cleaning the stairs his penis had accidentally slipped into the end of a Hoover "dustette" vacuum cleaner. However he then attempted to obtain erotic stimulation by switching the motor on and off. On examination two irregular circumferential lacerations were present in the prepuce, each about 1.5 cm. long, and there was a similar laceration on the dorsum of the glans penis. The glans and prepuce were oedematous. Micturition was normal. The lacerations were not extensive enough to warrant suture or circumcision, and healed satisfactorily in two weeks.

COMMENT

The method of masturbation used by these patients was rather ingenious but had disastrous results. They attempted to simulate an active sexual partner by introducing the penis into the tube of a vacuum cleaner and switching on (and in one case on and off) the suction power of the machine.

No similar case has been found in the literature.

We thank Mr. H. K. Vernon, Mr. G. O. Jelly, and Mr. J. H. Tasker for permission to publish these case notes.

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Reviews

INJURIES TO BONES AND JOINTS

The Management of Fractures and Dislocations. Volumes I and II. By Anthony F. DePalma, M.D. (Pp. 960+xviii; illustrated. £12 5s.) Philadelphia, London: W. B. Saunders Company, Ltd. 1959.

This is a large work, published in two weighty volumes. Nevertheless, in spite of the weight, the information it gives about principles and procedures in the early treatment of bone and joint injuries is concisely expressed and clearly presented. It is, in fact, a comprehensive atlas rather than a conventional textbook. The author's method is to take an aspect of his subject—types of fractures, for example—make brief, almost aphoristic, general remarks about it which are set, a sentence to a paragraph, well into the centre of the page; and then follow these below at the left-hand margin with brief, numbered examples or comments. These are then illustrated opposite on the right-hand side of the same page with accurate line-drawings—nearly two thousand of them in the two volumes. This may be an extravagant layout, and it certainly accounts for the weight, but it makes reference so clear and easy that from the reader's point of view the results are well worth it.

The author stresses the importance of radiography, and if one wishes to make the fullest use of the book one should compare one's own radiographs of an injury with his line-drawings (there are no radiographs or photographs in the book). This means that one's *x*-rays should have been taken exactly in the antero-posterior and lateral planes—it also means, of course, if the comparison is to be of any value, that one must have made the correct diagnosis. However, helpful as the text and line-drawings are, they have the limitation of not indicating the extent of the hazards in treating many fractures. Similarly, though the reader will discover when open operation after fracture or dislocation is considered justifiable, little is said of the ideal moment for such a procedure, nor of the contraindications to operation.

The methods of reduction and of immobilization advised are in most cases those in use in the orthopaedic departments of this country. Cortical onlay grafts and intramedullary nails are used, metal plates, wire, and bands having been discarded. Plaster-of-Paris is recommended as the standard material for immobilization, and the technique of its application is described, but, although there is ample reference to the calamities that may occur from careless application, it is not clearly stated that the initial turns of a circular plaster should be around the distal extremity of a limb. It appears that decisions on the extent of bony union are made on the *x*-ray appearance while the cast is on the limb. In Britain this practice has been found misleading.

The sections on spinal injuries, on pathological and birth fractures, and on complications of all types are interesting. It is welcome to find the names of Thomas, Colles, and others, but owing to descriptions of many types of ankle fractures Pott's name is more likely to be perpetuated by his pioneer work on the spine and the "puffy tumour."

This is a useful reference book, made particularly acceptable by the generous arrangement of only a little text and a figure or two on each page.

ST. J. D. BUXTON.

VIRAL AND RICKETTSIAL DISEASES

Viral and Rickettsial Infections of Man. Edited by Thomas M. Rivers, M.D., and Frank L. Horsfall, Jr., M.D. Third edition. (Pp. 967+xviii; illustrated. 63s.) London: Pitman Medical Publishing Co., Ltd. 1959.

This excellent textbook of viral and rickettsial diseases by various (mainly American) authors appears under the editorship of T. M. Rivers and F. L. Horsfall, and it is undoubtedly the most comprehensive which is at present available. It is of particular value because it combines a thorough treatment of the clinical aspects of virus diseases and their diagnosis with an up-to-date account of viruses themselves and their behaviour in the laboratory as well as in human populations.

The third edition appears six years after the second, and during a time of intensive activity in the field of virology. Fourteen additional contributors and seven more chapters were necessary to deal with the subject adequately, making 44 contributors and a volume of nearly 1,000 pages. The major additions have included excellent new chapters by S. S. Cohen, G. K. Hirst, and I. Tamm on general features of viruses, and it is gratifying to see that A. D. Hershey's chapter on bacteriophage is still retained in what is primarily a medical treatise. Naturally there are chapters dealing with important newly identified groups of viruses, such as the adenoviruses and the E.C.H.O. viruses, and the section on poliomyelitis is considerably expanded with a chapter on control of infection by J. Salk. All other chapters have been extensively rewritten and rearranged to include the developments of recent years.

The high standard of printing and illustration have been maintained as in previous volumes, and prospective readers should be grateful to the National Foundation whose grant has again made possible the remarkably low price.

MICHAEL STOKER.

GEOGRAPHICAL PATHOLOGY

Methods of Geographical Pathology. Report of the Study Group Convened by the Council for International Organizations of Medical Sciences. Edited by Richard Doll, M.D., F.R.C.P. (Pp. 72. 9s. 6d.) Oxford: Blackwell Scientific Publications. 1959.

This most useful and readable little book is the report of a study group sponsored by the Council for International Organizations of Medical Sciences under the auspices of U.N.E.S.C.O. and W.H.O. It deals with that part of epidemiology which is concerned with the incidence of disease in different communities, both large and small, and its relationship to features of the geographical and social environment.

The classical methods of studying geographical pathology, such as mortality statistics, are examined briefly and some of their limitations pointed out. A section is given to the planning of surveys where a population or a sample of it is examined directly for the presence or absence of a particular disease. Some attention is paid to the question of bias in surveys of this kind, particularly that introduced by observer error.

The members of the study group agreed on a short list of conditions which they thought suitable for study, and give brief suggestions as to how this should be carried out. The list consisted of the following conditions: rheumatoid arthritis, atherosclerosis and coronary thrombosis, chronic bronchitis, diabetes mellitus, cancer, congenital malformations, complications of pregnancy, and mental disease. They also suggest studies of blood-pressure in communities—not attempts to discover the

prevalence of hypertension. Individual epidemiologists may differ over the exact composition of a list of this nature, but most would agree that the majority of conditions mentioned require and are suitable for epidemiological research.

This book should be read by all who are interested in the effect of environmental factors on the incidence of disease. It can be finished in a few hours.

M. A. HEASMAN.

MEANING AND PSYCHOLOGY

Complex, Archetype, Symbol, in the Psychology of C. G. Jung. By Jolande Jacobi. Translated from the German by Ralph Manheim. (Pp. 236+xii. 21s.) London: Routledge and Kegan Paul. 1959.

Psychologists and psychiatrists—like the philosophers—are finding it more and more difficult to talk to one another because few of their terms have a fixed meaning. Gone are the days when everyone knew what was meant by ego and libido. The available vocabulary is becoming useless. Dr. Jacobi is right when she tells us in her first sentence that the present period is characterized by a terminological tower of Babel. Her aim is to remedy this for "complex," "archetype," and "symbol," three concepts in Jung's work about which misunderstandings are common.

Within her self-imposed limitations she has done what she set out to do, and in the doing has provided a commentary on other terms introduced by Jung. Nevertheless she is wide of the mark in claiming that Jung considered that the complex—not the dream as Freud believed—provided the royal road to the unconscious. Jung had no enduring interest in complexes as such, being more concerned in finding out by the investigation of dreams what the unconscious was doing about the complexes. To the main body of the book is added the analysis of an archetypal or collective dream using the method of amplification. This gives an informative application of the abstract topics discussed earlier. The translation is admirable. Postgraduate students will find this book of considerable value.

E. A. BENNET.

ENVIRONMENTAL STRESS AND SCHIZOPHRENIA

Die Ätiologische und Pathogenetische Bedeutung Nicht-endogener Faktoren für die Schizophrenie. By O. Schrappe, M.D. (Pp. 82. DM. 18.) Stuttgart: Georg Thieme Verlag. 1959.

This book on the aetiological and pathogenetic significance of non-endogenous factors in schizophrenia will be useful to psychiatrists who are sometimes called upon to express an expert opinion on the part played by environmental factors, such as combat stress or internment, in the causation or precipitation of manic-depressive illness or schizophrenia. While the chronological relationship between the onset of the psychosis and the incriminated environmental factor is often suggestive of such a connexion, the incidence of the endogenous psychoses has proved to be independent of war and other collective disasters. Nevertheless, the possibility of exceptional environmental stress playing some part among the causative factors in an individual case of endogenous psychosis cannot be excluded. In Great Britain such patients have sometimes been given the benefit of the doubt. German psychiatrists have followed the same practice, though apparently with even greater reluctance than their British colleagues. This is illustrated with the aid of five case records in this book. The author aptly quotes Kolle, who pointed out that it would be quite illogical to exclude the possibility of psychological stress occasionally precipitating an endogenous psychosis, while assuming that physical illness could have this effect. The book has a useful bibliography.

E. STENGEL.

PRISONERS OF THE JAPANESE

Destined Meeting. By Leslie Bell. (Pp. 256; illustrated. 18s.) London: Odhams Press. 1959.

This is the true story of a doctor and his wife who were prisoners in Singapore during the Japanese occupation of the island. The doctor was serving in the Army and first met his wife in Singapore. They were married only a few days before it fell and then were separated, one to the prisoners-of-war camp and the other to the civil-internees camp. He, like so many of his companions, suffered from dysentery, ulcers, and oedema, but she had the more dreadful experience of falling into the hands of the Kempei Tai, or military police, and endured the horrors of their methods of interrogation. The writer is most successful in describing the daily incidents of life in internment, and in simple straightforward language he tells of those terrible weeks of almost unbelievable brutality spent by the doctor's wife in the prison cells.

To medical men the book has a further interest because many of their colleagues were among those captured, and it describes something of the work they did to maintain health in difficult and at times desperate circumstances. Others played a prominent part as leaders in the civilian camps, and, mainly because of their useful activities, became suspect by the Kempei Tai. Two died as a result of their interrogation and five others only just escaped with their lives.

Destined Meeting is not just the story of two people; it is a piece of the history of our Commonwealth. It is true in every detail, and those who care to check can find the facts in the official accounts of the trials. To one who saw many of these events the book is of intense interest and brings back a stream of memories. To others it may be just another war book, but I think it will be found to be well worth reading and perhaps be given a place on the library shelf.

R. A. PALLISTER.

THE HAND

The Hand. Its Anatomy and Diseases. By John J. Byrne, M.D. (Pp. 384+xiv; illustrated. 80s.) Oxford: Blackwell Scientific Publications. 1959.

This book is based on the experience and practice of the Boston City Hospital. It is well illustrated and easy to read. In some aspects American experience and practice differ from our own: widely destructive symbiotic infections have not yet been reported in Britain, for which we can be grateful; pulp-space and tendon-sheath infections we generally drain with less radical incisions than those favoured a decade ago, which still remain in favour in Boston. The book covers a lot of ground in a comparatively short space compared with some of the recent works on the surgery of the hand. Yet it does not include an account of primary excision and grafting of full-thickness skin-loss burns—surely one of the greatest advances in surgery of the hand. The book is a contribution to this important subject and I can recommend it to others,

particularly the resident staff of casualty and accident departments with responsibility for the primary care and often, unfortunately, for the complete care of injuries of the hand.

WILLIAM GISSANE.

S.L.E.

A Mount Sinai Hospital Monograph on Systemic Lupus Erythematosus. Edited by George Baehr, M.D., and Paul Klemperer, M.D. (Pp. 84+iv; illustrated. $3.75.) New York, London: Grune and Stratton. 1959.

The staff of Mount Sinai Hospital, New York, have made significant contributions to the study of systemic lupus erythematosus. The present work is a monograph bringing knowledge of the subject on the scientific side up to date.

The significant features of the disease are disturbance of connective tissue, injury to nuclei, and granulomatous reactions resulting from these. Fibrinoid is discussed and the need for a chemical definition is stressed. Biochemical tests have tended to discredit the original enzyme hypothesis, and recent immunological investigations are reviewed. It is concluded that there is much speculation but little exact knowledge. Miescher's antiglobulin consumption test is described. It arose from his discovery that heating serum taken from patients suffering from S.L.E. with large quantities of leucocyte nuclei before performing the L.E. cell test inactivated the serum.

One paper deals with changes encountered in blood elements in this disease and the mechanism of the L.E. cell phenomenon. Another deals with clinical features and notes that the disease is seen in negroes, both male and female. In children the onset may be associated with loss of weight and acute joint symptoms. In treatment, antimalarial drugs do not find much favour. The difficulty in determining whether convulsions are due to the disease or to treatment is mentioned.

J. T. INGRAM.

EPONYMOUS INSTRUCTION

Notable Names in Medicine and Surgery. By Hamilton Bailey, F.R.C.S.(Eng.), F.A.C.S., F.R.S.(Ed.), and W. J. Bishop, F.L.A. (Pp. 216+xiii: illustrated. 35s.) London: H. K. Lewis and Co., Ltd. 1959.

Though in general it is better that a disease, structure, or instrument should be described by a word which indicates its nature, there are many instances in which this would entail too long a word or would displace a time-honoured eponym. Yet as time passes the name is remembered but the person forgotten, and the authors of this attractive book have done well to recall to our memory some of these famous physicians and surgeons. It is a delightful book to dip into, for one thereby learns many interesting surgical facts which are not usually inserted in textbooks. This edition contains some new names, for, as the authors tell us, fashions in medicine and surgery change and advances in knowledge bring new people into prominence. It is a book which should prove useful both for student and practitioner.

ZACHARY COPE.

A second annotated bibliography on *Aviation Medicine*, covering the literature for 1953, has been published by the Aero Medical Association, 2642, University Avenue, St. Paul, Minn. (354 pp.; $5). Its arrangement follows that used in the previous volume, though the number of items is greater than in Vol. 1 (1,386 as compared with 918). Indexes are included covering both volumes.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received.

Communicable and Infectious Diseases: Diagnosis, Prevention, Treatment. By Franklin H. Top, A.B., M.D., M.P.H., F.A.C.P., F.A.A.P., F.A.P.H.A., and Collaborators. Fourth edition. (Pp. 812; illustrated. £7 10s.) St. Louis: C. V. Mosby Company. London: Henry Kimpton. 1960.

Principles of Public Health Administration. By John J. Hanlon, M.S., M.D., M.P.H. Third edition. (Pp. 714; illustrated. 78s. 6d.) St. Louis: C. V. Mosby Company. London: Henry Kimpton. 1960.

Neurology of Infancy. By Anatole Dekaban, M.D., Ph.D. (Pp. 388+xiv; illustrated. 96s.) London: Baillière, Tindall and Cox, Ltd. 1959.

Experimental Surgery: Including Surgical Physiology. By J. Markowitz, M.B.E., M.B.(Tor.), Ph.D., M.S. in Exp. Surg. (Minn.), J. Archibald, D.V.M., M.V.Sc., Dr.Med.Vet.(Giessen), M.R.C.V.S., and H. G. Downie, D.V.M., M.S.(Cornell), M.V.Sc. Fourth edition. (Pp. 931+xii; illustrated. £5.) London: Baillière, Tindall and Cox, Ltd. 1959.

The Modern Educational Treatment of Deafness. Report on the International Congress Held at the University of Manchester, July 15-23, 1958. Edited by Sir Alexander Ewing. (Illustrated. 45s.) Manchester: Manchester University Press. 1960.

Current Therapy 1960. Latest Approved Methods of Treatment for the Practicing Physician. Edited by Howard F. Conn, M.D., with 12 consulting editors. (Pp. 808+xxxii. 84s.) Philadelphia and London: W. B. Saunders Company. 1960.

A Manual of Tropical Medicine. By George W. Hunter, III, Ph.D., Col. U.S.A. (Ret.), William W. Frye, Ph.D., M.D., Sc.D.(Hon.), and J. Clyde Swartzwelder, Ph.D. Third edition. (Pp. 892+xxx; illustrated. £5 5s.) Philadelphia and London: W. B. Saunders Company. 1960

Clinical Management of Behavior Disorders in Children. By Harry Bakwin, M.D., and Ruth Morris Bakwin, M.D. Second edition. (Pp. 587+xi; illustrated. 77s.) Philadelphia and London: W. B. Saunders Company. 1960.

Anatomy. A Regional Study of Human Structure. By Ernest Gardner, M.D., Donald J. Gray, Ph.D., and Ronan O'Rahilly, M.Sc., M.D. Illustrated by Caspar Henselmann. (Pp. 999+vii. £5 5s.) Philadelphia and London: W. B. Saunders Company. 1960.

Polypeptides which Affect Smooth Muscles and Blood Vessels. Proceedings of a Symposium Held in London on March 23 and 24, 1959. Edited by M. Schachter, M.D., M.Sc. (Pp. 336+xv; illustrated. 50s.) Oxford, London, New York, Paris: Symposium Publications Division, Pergamon Press. 1960.

Differentialdiagnose Innerer Krankheiten: Eine Kurzgefasste Darstellung für Ärzte und Studierende. By Dr. Robert Hegglin. Seventh edition. (Pp. 913+xx; illustrated. DM. 79.50.) Stuttgart: Georg Thieme Verlag. 1960.

Taschenbuch Klinischer Funktionsprüfungen. Edited by Professor Dr. Arthur Gitter and Professor Dr. Ludwig Heilmeyer. Sixth edition. (Pp. 521+xxiii; illustrated. DM. 18.) Jena: VEB Gustav Fischer Verlag. 1960.

A New Tropical Hygiene. By Leonard Goodwin, M.B., B.S., B.Pharm., B.Sc., and Anthony Duggan, M.D., D.T.M. & H. Illustrated by Ian T. Morrison, M.A. (Pp. 148. 5s. 6d.) London: George Allen and Unwin, Ltd. 1960.

Travaux Scientifiques. By J. Nicolesco. (Pp. 616; illustrated.) Bucharest: Éditions de l'Academie de la République Populaire Roumaine. Paris: Masson et Cie. 1959.

Substituentii Macromoleculari de Volum ai Plasmei. By G. Esanu and S. Banc. (Pp. 204; illustrated. Lei 11.70.) Bucharest: Academiei Republicii Populare Romine. 1959.

Estrogen-Induced Tumors of the Kidney in the Syrian Hamster. By Hadley Kirkman. (Pp. 139; illustrated. $1.25.) Bethesda, Maryland: National Cancer Institute. U.S. Department of Health, Education, and Welfare. 1959.

New and Nonofficial Drugs 1960. Evaluated by A.M.A. Council on Drugs. (Pp. 768+xxviii. 30s.) Philadelphia and Montreal: J. B. Lippincott Company. London: Pitman Medical Publishing Co., Ltd. 1960.

Medieval and Renaissance Medicine. By Benjamin Lee Gordon, M.D., F.I.C.S. (Pp. 843+xii; illustrated. 63s.) London: Peter Owen. 1960.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY JUNE 25 1960

THE PRESIDENTIAL ADDRESS

Sir Arthur Porritt's address at Torquay this week (published in our opening pages) was memorable for its content and for the fact that it was delivered in the presence of the retiring President, Prince Philip, Duke of Edinburgh. The B.M.A. was happy and honoured to have one of its ordinary Annual Meetings attended by Prince Philip, and it was fitting, too, that he should listen to an address given by one who is Serjeant-Surgeon to Her Majesty the Queen, the Royal Patron of the Association. "Commonwealth and Common Health," the title of Sir Arthur's address, is a time-honoured couplet. The circumstance of the chosen theme made it especially apt on this occasion. Our new President is a New Zealander by birth, and will lead the Association when it meets in Auckland, New Zealand, early next year. His great record as an athlete and his creed of physical fitness gives him still one more bond of interest with his Royal predecessor as President. The Torquay meeting will long be remembered for the unique occasion provided by the historic event of Monday this week.

At a time when some have felt that the bonds of Commonwealth may be weaker than they were, Sir Arthur Porritt's fervent expression of belief in the idea and the ideals of this great association of independent but like-minded nations comes as a stirring encouragement. The life of the medical profession in Great Britain has been continually enriched by medical men from the Commonwealth who have elected to return to the mother country, men whose contributions to medicine have often enough earned them a permanent place in the history of our great profession. And they have brought with them, too, a vigour and freshness of viewpoint which is enormously stimulating to an older country, tending at times to become set in its ways. As a "doctor" Sir Arthur returns again and again in his address to the significance of the individual: "In aligment with these ideas," he writes, "the common health of a commonwealth is achieved through the association of a number of individually responsible doctors in friendly contact and co-operation, united through the medium of a vocational desire to save life, alleviate suffering, and actively promote well-being." This common concern of doctors the world over gives them a common bond which makes for peace and mutual understanding, brought about and intensified by medical men and women whose profession makes them more conscious than other groups of the value of the individual, and of the preservation of those freedoms without which the individual loses his identity.

Much of this year's address is devoted to the relationship between profession and government, and, as the new President of the B.M.A. is Chairman of the Porritt Committee, what he says on this subject is of especial interest. More and more governments, he observes, are accepting responsibility for part or all of the common health. In this he sees "the vital necessity of establishing a working relationship" between the two. However much the medical profession in this and other countries has come to depend on government, Sir Arthur, with telling effect, shows how government more and more has to depend upon medicine because of the new problems that follow in the wake of the revolutionary advance of modern medical science. "Medicine," it has been said[1] recently, "has changed the nature of history by adding a new dimension to it."

Looking more closely at the medical scene in Britain to-day, Sir Arthur refers to the hope held out in 1948 that there would be a partnership in which government and profession would co-operate to ensure the success of the National Health Service. "What a tragedy it is," he writes, "that this conception of equal partnership between government and profession for the eminently praiseworthy purpose of ensuring the well-being of the nation should have failed so dismally." He says roundly and vigorously that the N.H.S. has not worked out as it should have done, and that the original idea of partnership has been displaced by the "employer–employee relationship." He lays much of the blame for this upon the Civil Service for "its relative failure to cope with a service which is essentially concerned with people, not things." Sir Arthur continues: "And, when one appreciates that those people are, in fact, patients and doctors, joined in the Health Service in a peculiarly personal relationship, then it becomes only too evident that an impersonal Government department is not the right or the best mechanism through which to administer it."

This is an intricate matter. Sir Arthur's forthright statement will rouse in the minds of many readers memories of the debates that went on in the years just before 1948. Those who agree with him will read with interest his alternative suggestion that the

[1] *Daily Telegraph*, June 16, 1960.
[2] *Supplement*, April 23, 1960, p. 239.

N.H.S. should be administered by an independent corporation. "What such a scheme implies in essence," he writes, "is the disbursement and application of public moneys by an independent body without the intervention of departmental machinery, and without the need for a Minister to be answerable to Parliament for the day-to-day conduct of a service." And this, he says, would lift medicine out of the realm of party politics—"an influence which has bedevilled the National Health Service from before its inception."

Sir Arthur has also directed his penetrating gaze on his own profession. He detects a great weakness in the existence "of the present numerous pleomorphic associations" which represent the profession in its dealings with the Government on Health Service matters. Taking as his guide the founder of the B.M.A., Sir Arthur pleads that the Council of the B.M.A. should become in fact a Council of the whole profession. He makes the highly interesting suggestion that the B.M.A. shall make it possible for the Royal Colleges and Corporations to be adequately represented on its Council as of right.

Sir Arthur Porritt has had the courage to speak plainly on matters about which he has thought deeply. He speaks with authority and refreshing vigour. No one can view with complacency the present relationship between profession and government, and only a few weeks ago the B.M.A. Council approved a report[2] which conveyed some of the profession's anxieties about this relationship. These knotty problems of relationship cannot be settled overnight. In this second decade of the N.H.S. complacency and apathy will be enemies numbers one and two to the satisfactory evolution of a system of organized medical care which both country and profession will be proud of. Sir Arthur Porritt has reopened the subject for debate, and has whetted the appetite of the profession for the report of his Committee. Whatever may happen in the future, doctors will be at one with him in striving to maintain "that unquenchable desire for freedom which is such a fundamental characteristic of our nation and our profession."

CYTOMEGALIC INCLUSION DISEASE

When cells infected with a virus are not completely destroyed, but retain their form, one of the abnormalities may be a conspicuous local change, either in the nucleus or in the cytoplasm, often surrounded by a narrow clear zone. Such bodies have been known for many years as inclusion bodies, and are often typical of the particular virus—for example, the Guarnieri bodies caused by the vaccinia virus. Yet the presence of inclusion bodies does not necessarily imply a virus infection, any more than their absence excludes it, and inclusions are found in the cells of otherwise apparently normal organs.[1] Nevertheless, the constant presence of very striking inclusions in many cells raises strong suspicions that a virus is the cause.

These bodies are to be seen in cases of cytomegalic inclusion disease, of which the first case was described in 1904 in a congenitally syphilitic foetus.[2] Probably the climate of opinion at that time was responsible for much of the paper being taken up with discussing the likeness of the cells to protozoa. A similar condition has been observed in the guinea-pig, and a virus has been found to cause it and a like disease in other rodents. Experiments on the transmission of the human form of the disease have had to await the rise of tissue-culture techniques during the last few years. The isolation of the virus was reported by M. G. Smith,[3] using the tissues of two infants with the disease, and later by T. H. Weller and colleagues,[4] using liver biopsy material. It is interesting that the virus was one of several latent viruses recovered from human adenoids grown in tissue culture.[5] Very little is known about the viruses themselves. They produce a cytopathic effect in a variety of tissues in culture. They are ether-sensitive, but do not agglutinate red cells. The subject has been reviewed recently by Smith.[6]

The clinical picture of cytomegalic inclusion disease (or salivary gland virus infection) varies with the age of the patient. In babies it is generally fatal, and some cases have been characterized by anaemia, jaundice, hepatosplenomegaly, and cerebral calcification. However, it may present with ocular signs, such as choroiditis,[7] or with any of a wide variety of signs. Inclusions are found in enlarged cells, particularly in the epithelium of renal tubules and bronchi and also in the salivary glands. In older children the disease is usually associated with, and presumed to be secondary to, some serious debilitating condition such as fibrocystic disease of the pancreas. The typical cells may be found in the urine of patients. The presence of antibodies in the sera of many adults makes it likely that subclinical infection is widespread, and is also probably the reason why the clinical condition has rarely been reported in adults.

[1] Cowdry, E. V., *Arch. Path.* (*Chicago*), 1934, **18**, 527.
[2] Jesionek, W., and Kiolemenoglou, C., *Münch. med. Wschr.*, 1904, **51**, 1905.
[3] Smith, M. G., *Proc. Soc. exp. Biol.* (*N.Y.*), 1956, **92**, 424.
[4] Weller, T. H., Macauley, J. C., Craig, J. M., and Wirth, P., ibid., 1957, **94**, 4.
[5] Rowe, W. P., Hartley, J. W., Waterman, S., Turner, H. C., and Huebner, R. J., ibid., 1956, **92**, 418.
[6] Smith, M. G., *Progr. med. Virol.*, 1959, **2**, 171.
[7] See *Brit. med. J.*, 1959, **2**, 558.
[8] Symmers, W. St. C., *J. clin. Path.*, 1960, **13**, 1.

W. St. C. Symmers[8] has recently described three cases in which each patient had a long-standing illness ; two had received antibiotics and steroids, and the third antibiotics and cytotoxic drugs such as nitrogen mustard. In all three cases the presence of cytomegalic inclusion disease was obscured by a fairly complex clinical picture, and it seems that at least when examining biopsy material "fortune favours the prepared mind." Symmers suggests that the previous illness, or the therapy, or both, had predisposed the patients to infection with the virus. In support of this is the fact that in older children there seems always to be some such illness before this one becomes overt, and also that in each of these three cases pneumonia caused by *Pneumocystis carinii* was present. It is also possible that the long previous illness and therapy had acted by opening the door to infection from within rather than from without. The virus, instead of being enabled to enter a body rendered susceptible to it from outside, might in fact have been present from infancy and been enabled to cause changes in cells in a way which had previously been impossible. A parallel, on a small scale, is the virus of herpes simplex, which can cause cellular change, and hence disease, after lying dormant for years at a time. Exactly what the mechanism is by which eruptions of herpes simplex are caused is not known, but it is possible that a similar mechanism may operate. Whatever the pathogenesis, it is clear that, except in the less common cases in infancy with the typical syndrome described above, diagnosis in life is likely to be extremely difficult, if not impossible.

OVERCOMING MENTAL HANDICAPS

The resurgence of interest in the problems of the mentally subnormal in the last few years has been remarkable and owes much of its impetus to the activities of parents of affected children. At a recent successful conference organized by the Berkshire Association for Mentally Handicapped Children, Sir John Wolfenden, Vice-Chancellor of the University of Reading, said that the value of a society could be judged by the extent to which it cared for those of its members unable to care for themselves. The subject of the conference was the education and training of mentally handicapped children, and the parents of such children who were present must have been given hope and encouragement by the excellent papers which were read.

The training of mentally handicapped children begins in the home, and for some—for example, those living in rural areas or in places where no occupation centres or similar facilities exist—this is the only training they receive. If the parents are to be successful in this task they have to overcome the emotional distress of having an afflicted child and to understand the nature of his condition and the extent of his abilities. When groups of interested experts—such as a paediatrician, a psychiatrist, an experienced social worker, and a teacher at an occupational centre—come together to assist and guide parents with the many problems that may arise, then much good can be done. Such counselling services have developed in one or two areas, but, although local authorities might be considered to have a duty to provide help of this kind, only 18 out of 149 have done so according to the most recent information. Most parents, however, probably need a more understanding and personal service, and there is every opportunity here for family doctors to lead the field. Unfortunately for the most part their medical training told them little or nothing about the problems of mental subnormality and the parents' need for guidance and personal help over the whole period of the child's training.

The teacher at a training centre will often be able to offer useful guidance on specific problems to the parents of a mentally handicapped child, and if a domiciliary advisory service based upon the training centres could be built up this would help the parents with their child in the early years and would provide a valuable link with later training at the centre. Unfortunately, the shortage of staff makes this more a theoretical than a practical proposition at the present time. Despite this difficulty formal training in day centres is now being provided on an increasing scale. During 1958 and the first half of 1959, the latest date for which figures are available, 100 additional centres were opened. But there are still nearly 5,000 children in Britain suitable for day training who are not yet attending centres.

More and more is being learned about how children should be taught in training centres. The idea of a curtailed primary-school programme is eschewed, and new methods have to be thought out based upon the abilities and characteristics of the children themselves. Much useful information would be obtained if the observations and experiments made by the teachers themselves could be co-ordinated. There is an excellent precedent for this : many of the present teaching methods used in ordinary schools originated in the studies of the earlier workers in this field of mental subnormality. The training of even the most backward child is a form of teaching. Thus the classification of children as "ineducable" is

misleading and the division of responsibility for subnormal children between the local education authority and the local health authority is irrational—and particularly frustrating in those areas, and there are regrettably many of them, where the two bodies show little evidence of co-operation in this task.

Some mentally handicapped children are admitted to hospital for permanent or prolonged care because of a break-up of the family or because anti-social behaviour has brought them to the attention of the courts. The proportion of less severely affected children who are now admitted to institutions is considerably less than it was a few years ago. This is a particularly encouraging trend, but even more encouraging is the fact that although hospitals are now taking the most severely handicapped children they are nevertheless continuing to carry out enlightened training programmes.

MAGNESIUM AND CORONARY DISEASE

The high incidence of ischaemic heart disease makes it important to follow up any experimental work suggesting a possible new therapeutic approach. In this context the use of magnesium is of interest and has been studied in two different aspects. The effect on blood coagulation has been studied in Great Britain by H. B. Anstall, R. G. Huntsman, H. Lehmann, G. H. Hayward, D. Weitzman, and B. A. L. Hurn.[1 2] In Canada E. Bajusz and H. Selye[3] have found in experimental animals that magnesium chloride prevented myocardial necrosis or limited its extent after ligature of coronary vessels in experimental animals.

As to the effect of magnesium on blood clotting, G. D. Greville and H. Lehmann[4] had previously shown that small amounts of magnesium added to freshly drawn unclotted blood would delay formation of fibrin, suggesting as an explanation cation antagonism between Mg^{++} and Ca^{++} in competition for clotting factors. The magnesium salt was administered with peptone because previous work had indicated that amino-acids increase the solubility of sparingly soluble divalent cations, and the ingestion of protein increases the absorption of such salts. In the initial work on human subjects[1] 1 g. of magnesium citrate and 50 g. of peptone were given orally to adults. The effect on blood clotting was studied by the thrombin-generation technique of whole blood contained on a glass surface. With these amounts thrombin generation was delayed 4 to 6 minutes for five to six hours. Using 0.25 g. of magnesium and 15 g. of peptone the same sort of effect could be found but the duration was much less (one to two hours). Delayed thrombin generation could also be demonstrated after intravenous injection of the magnesium salt, but the effect lasted only 15 to 30 minutes.[2] Two patients with ischaemic heart disease were given magnesium 1 g. and peptone 50 g. three times daily. There was no effect on the myocardial conductivity as shown by the E.C.G. For prolonged treatment the chloride or sulphate of magnesium was preferable to the citrate.

Bajusz and Selye[3] describe the value of magnesium chloride fed to rats in the prevention of myocardial necrosis. The test animals were fed the solution of magnesium twice daily for five days before occlusion of the left coronary artery. A control group were given only water. Eight days after the occlusion of the vessel the animals were killed and the degree of necrosis judged by examination of the heart with a dissecting loupe and subsequently by histological examination. In contrast to the control group the treated group showed little or no evidence of lesions. Even in those treated animals in which minimal lesions were found the absorption of the damaged muscle fibres was virtually complete and inflammatory reactions in the affected area were slight.

Though both these experimental uses of magnesium leave us in some difficulty in appreciating the fundamental nature of the processes involved, they nevertheless could point the way to a new therapeutic approach to the management of the patient who has already suffered one myocardial infarction, for it is well established that these patients are at considerable risk from recurrence.

[1] Anstall, H. B., Huntsman, R. G., Lehmann, H., Hayward, G. H., and Weitzman, D., *Lancet*, 1959, **1**, 814.
[2] Huntsman, R. G., Hurn, B. A. L., and Lehmann, H., *J. clin. Path.*, 1960, **13**, 99.
[3] Bajusz, E., and Selye, H., *Canad. med. Ass. J.*, 1960, **82**, 212.
[4] Greville, G. D., and Lehmann, H., *J. Physiol.*, 1944, **103**, 175.

EFFECTS OF RADIATION ON THE HEART

In planning radiotherapy for diseases of the chest the heart is often unavoidably included to a greater or less extent in the field irradiated. Although irradiation has now been used successfully for many years in the treatment of neoplasms and reticuloses of the chest, there have been few reports of cardiac damage resulting from it, and these have been largely "mediastino-pericardial reactions," when extra-cardiac damage in the mediastinum has led to pericarditis.

In 1957 A. G. W. Whitfield and P. B. Kunkler[1] and now M. Catterall and W. Evans[2 3] have reported transient pathological signs in the electrocardiogram, developing within a few weeks or months of treatment of carcinoma of the breast and later disappearing. These electrocardiographic changes have been unaccompanied by any other signs or symptoms and appear to be essentially benign, since the electrocardiogram had always reverted to its original pattern a year later. A. Jones and J. Wedgwood,[4] on the other hand, have concluded from their study of patients receiving radiotherapy for carcinoma of the breast that no pathological electrocardiographic changes occurred as a result of radiation, except when there was previous ischaemic heart disease. They did note small alterations in right chest leads, but they ascribed these to changes of

[1] Whitfield, A. G. W., and Kunkler, P. B., *Brit. Heart J.*, 1957, **19**, 53.
[2] Catterall, M., *Brit. J. Radiol.*, 1960, **33**, 159.
[3] ——, and Evans, W., *Brit. Heart J.*, 1960, **22**, 168.
[4] Jones, A., and Wedgwood, J., *Brit. J. Radiol.*, 1960, **33**, 138.

position or respiration and did not consider them to be of pathological importance.

The apparent discrepancy between these reports is explicable on the different electrocardiographic leads used in each study. Jones and Wedgwood used V leads, in which the direction of the T wave in right chest leads is considerably modified by changes of position and the phases of respiration, as well as by cardiac disease. They recognized this difficulty to be of particular importance in their study, since leads V_1 and V_2 overlay the region of the heart most exposed to radiation. Catterall and Evans, on the other hand, used CR leads, in which the direction of the T wave in the right chest is relatively little affected by position and respiration, and by this method showed that the changes in these right chest leads after radiation were due to an effect on the heart and not to extra-cardiac factors.

The importance of these studies lies, not so much in showing that radiation therapy for carcinoma of breast may slightly damage the heart—either the pericardium or the myocardium or both—as judged from the electrocardiogram, but in emphasizing that this damage is subclinical and completely reversible in the electrocardiogram, provided care is taken in planning the isodose distribution of radiation within the thorax. Recognition of this electrocardiographic sign will occasionally obviate an unwarranted diagnosis of myocardial infarction in these patients.

MEDICAL GEOGRAPHY

By the turn of the century careful consideration of the climate, terrain, vegetation, and demographical features which favoured the spread of communicable diseases had contributed to knowledge of their aetiology in various parts of the world. It was on a geographical basis, too, that early work on nutritional disorders was carried out. For instance, the fact that beriberi was prevalent in certain regions where people ate particular diets led K. Takaki[1] to the discovery of its cause in Japan, and particularly the Japanese navy; similarly, J. Goldberger[2] was able to associate pellagra and a diet of sweet corn in the southern United States. A. Hirsch in his massive and classical monograph,[3] first published in 1881, devoted sections to chronic bronchitis ("met with on a large scale in all parts of the British Isles"), neuroses, diabetes, and atheroma, to mention a few. Interest has thus been shown for many years in the distribution of the disorders which perplex us to-day, and now the idea that the secrets of disease may be unfolded by a geographical approach has again been receiving attention on both sides of the Atlantic. Next week the Seventh International Conference of the International Society of Geographical Pathology will be held in London, the main topic for discussion being "Eclampsia and Pre-eclampsia in Pregnancy."

As a consequence of the successful use of the central files of the U.S. Veterans' Administration to delineate the distribution of sarcoidosis[4] in North America, a Research Division in Geographical Epidemiology was set up in the central office, Washington, D.C., in 1959, in association with Johns Hopkins University School of Public Health, to examine other disease patterns. Under the direction of E. D. Acheson studies of the geographical distribution of multiple sclerosis, ulcerative colitis, and regional enteritis have been completed, and reports are to appear in the British and American medical press during the next few months.

Here in Britain the initiative has been taken by the Royal Geographical Society, which has formed a committee under the chairmanship of Lord Nathan to promote and support research in medical geography. This includes geographers, anthropologists, and the following medical men: Professor A. L. Banks, Department of Human Ecology, University of Cambridge; Dr. A. L. Cochrane, Pneumoconiosis Research Unit, Glamorganshire; Professor T. H. Davey, Liverpool School of Tropical Medicine; Professor F. R. G. Heaf, Department of Tuberculosis and Chest Diseases, University of Wales; Dr. J. A. Hislop, Department of Human Ecology, University of Cambridge; and Professor George Macdonald, Ross Institute of the London School of Hygiene and Tropical Medicine. Apart from such research as the committee may itself instigate, it is anxious to offer any advice which may be helpful to workers already involved in this or allied fields. A special correspondent in *The Times*[5] recently suggested that the forests of Brazil are probably the last place on earth where a cartographer might be tempted to write *Hic sunt dracones*; it is to be hoped that through the activities of the new American department and our committee here the medical "dragons" will soon be banished for ever.

DISTRIBUTION OF HAIR

The hair follicles show a remarkable degree of autonomy. The levels of hormonal stimulation to which each will respond are genetically determined, and the predestined career of each follicle is little influenced by local factors other than the directly destructive, and not at all by grafting to some other region of the body. It follows that the changes in the scalp and body hair throughout life conform in general to certain familiar and fairly consistent patterns, but that genetic factors ensure a wide range of variation in degree and in morphological detail. Since patterns of hair growth considered abnormal are frequently used as a convenient index of endocrine function, accurate knowledge of the range of normal is of such obvious importance that the relative lack of satisfactory surveys of suitably large numbers of individuals is surprising.

The rapid advances in our knowledge of the suprarenal hormones, including the recognition of the Stein–Löwenthal syndrome, have emphasized the complexity of the problem of hirsuties and have increased the need for reliable information on the range of normal hair patterns in women. The recent studies

[1] Takaki, K., *Lancet*, 1906, **1**, 1369.
[2] Goldberger, J., *J. Amer. med. Ass.*, 1922, **78**, 1676.
[3] Hirsch, A., *Handbook of Geographical and Historical Pathology*, 1881, English translation by C. Creighton, London.
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[5] *The Times*, March 31, 1960, p. 13.

[1] Shah, P. N., *Amer. J. Obstet. Gynec.*, 1957, **73**, 1255.
[2] Thomas, P. K., and Ferriman, D. G., *Amer. J. phys. Anthrop.*, 1957, **15**, 171.
[3] Melick, R., and Taft, H. P., *J. clin. Endocr.*, 1959, **19**, 1597.
[4] Wayne, E. J., *Brit. med. J.*, 1960, **1**, 78.

of P. N. Shah[1] on Indian women and of P. K. Thomas and D. G. Ferriman[2] on white women are useful, but many more such surveys will be required before the maximum possible information can be derived from the clinical examination of the patient.

The patterns of hair distribution and hair density in the elderly often form the basis for clinical deductions, yet the study of normal people in this age group has been almost completely neglected. R. Melick and H. P. Taft,[3] of the Department of Medicine, University of Melbourne, have carefully recorded their observations on 167 men and 189 women over 60 years of age in order to assess the diagnostic value of absent or reduced body hair in old people. The absence of axillary hair in women over 60 is too frequent to be of diagnostic value; its absence in men is of greater significance except in the very old. Complete loss of pubic hair is abnormal, but partial loss is common. Hair on the upper lip and chin in women over 60 has no diagnostic significance, but hair elsewhere on the face must be regarded as needing investigation. There was, however, no association beween its presence and the absence of pubic and axillary hair. The absence of the outer third of the eyebrows in a sixth of the subjects of both sexes, though clinically euthyroid, reduces the value of this sign in the diagnosis of hypothyroidism; E. J. Wayne has found it to be valueless.[4] It is to be hoped that the obvious value of this well-conducted survey will stimulate others to record their observations of the changing patterns of hair growth in different races and at all ages.

ROAD DEATHS AT CHRISTMAS

Public anxiety over the high total of deaths from road accidents last Christmas found expression in Parliament and the press. Consequently the Minister of Transport asked the Road Research Laboratory, a Government institution, to investigate the causes of them. The main conclusion of its report,[1] published last week, may be expressed in this sentence from it: "The weather was bad and the proportion of people involved in the accidents who were known to have been drinking was unusually high."

In the four days December 24–27, 1959, there were 161 road-accident deaths in England and Wales. This total is about 2½ times that for 1956, twice that for 1957, and 1½ times that for 1958. Part of the increase was probably due to there being more vehicles on the road, but the figure was nevertheless about 3 times the number per mile travelled in 1959 as a whole and about twice as high as the number for the rest of that December.

It seems possible that the thoroughness of this investigation may have shown a rather higher proportion than usual of people who had been drinking, so it is not easy to use the figures for comparison. Even so, the report considers that the figures for drivers may have been understated, perhaps considerably. The following are of interest:

	Total Involved in Fatal Accidents	No. Who had Been Drinking
Pedestrians	83	44
Drivers	169	52
Motor-cyclists	28	4
Pedal-cyclists	7	1

In at least 56% of the cases "one or more of the persons involved had been drinking alcohol in some form not long before the accident occurred. In a normal period the corresponding figure is 18%." The 161 people killed were classified as follows: pedestrians 81 (children 3), drivers 22, passengers 28, motor-cyclists 15, motor-cycle passengers 8, pedal-cyclists 7. The proportion (70%) of fatal accidents on roads with a speed limit was higher than usual, and the proportion occurring when it was dark and wet was particularly high. The other factors investigated did not differ much from those found whenever a study of fatal road accidents is carried out. They may nevertheless play their part in the causation of serious accidents; an example is the failure of motor-cyclists to wear crash helmets.

Recent work[2 3] has shown that small quantities of alcohol in the blood-stream, at levels far below those at which symptoms of drunkenness as ordinarily understood are apparent, may impair a person's ability to carry out tests resembling driving. Thus, when the B.M.A.'s Special Committee came to consider the highest level in drivers "that can be accepted as consistent with the safety of other road users," it suggested 50 mg. per 100 ml. of blood.[4 5] This is roughly equivalent to 1½ pints of beer or 3 single whiskies. Many people would regard these as rather small amounts and to limit drinking to this extent before driving would entail a social revolution.

Since travelling over wet, congested roads in the dark may tax the skill of a sober driver, let alone one who has had a few drinks, it is unfortunate that the report says nothing about the makes and ages of the vehicles involved in these accidents. Yet, as any experienced driver knows, cars vary greatly in the safety with which they may be driven in adverse circumstances. This is equally true of motor-cycles, and the same failure to be specific marred an earlier report.[6] It is welcome news that the road injuries research group[7] at Birmingham under Mr. W. Gissane is to investigate these problems of design in relation to safety.

ELECTION OF B.M.A. OFFICERS

At the Annual Representative Meeting at Torquay last week the Representative Body elected as its chairman Dr. A. Talbot Rogers in succession to the retiring chairman, Dr. Arthur Beauchamp. Dr. J. A. L. Vaughan Jones was elected to succeed Dr. Talbot Rogers as deputy chairman of the Representative Body for one year. Mr. L. Dougal Callander was re-elected unopposed to serve for three years as Treasurer of the B.M.A. At the meeting of the new Council on June 20 Dr. S. Wand was re-elected chairman of Council for the session 1960–1.

[1] *Road Accidents, Christmas 1959*, Road Research Laboratory, D.S.I.R.' 1960, H.M.S.O.
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[5] *Brit. med. J.*, 1960, **1**, 256.
[6] See annotation, ibid., 1952, **1**, 1183.
[7] Ibid., 1960, **1**, 1631.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Acute Rheumatism and Paediatric Beds

SIR,—At a meeting of the Royal Society of Medicine Gairdner[1] spoke of the decline in the need for children's hospital beds. This he ascribed to the rising standard of infant care and feeding, the lowered incidence of certain infectious diseases, and the general availability of antibacterial drugs to general practitioners; these and similar views have been widely quoted whenever hospital planning is under consideration. Much remains to be done before all children are nursed in suitable units, but the general improvement in children's physique and in standards of home-care would lead us to expect that there should be no further increase in the call on paediatric beds. Nevertheless, a word of warning is needed, and Taylor and Davison[2] have shown that there has been no appreciable fall in requirements in Newcastle between 1950 and 1957.

Our recent experience in Oxford serves as a reminder of the fallibility of planners and the possible recrudescence of diseases thought to be in decline.

Acute Rheumatism and Chorea

We have no reliable figures to confirm our impression of a considerable increase in the number of streptococcal infections over the past year, but we have undoubtedly seen an unusual number of children with acute rheumatism and chorea recently. These cases have been sufficiently numerous to cause a temporary shortage of beds; at one time nine children with active rheumatism were being nursed in one of our two children's units (34 beds) and two in the other unit (24 beds), and there have been 15 admissions in the first four months of 1960. None of these children has had a previous (diagnosed) attack and in several the illness has been severe. Our patients will, at best, require long periods of supervision with prophylactic penicillin or perhaps dietetic measures against relapse; special convalescent hospital schooling will be required by a number in the immediate future, and several give rise to some anxiety with regard to their return to normal health.

The recent position here in regard to rheumatism is shown against a background of the past 12 years. These earlier admissions (Fig. 1) showed no preponderance in the first quarter of each year, and they included at least two readmissions during the course of the year 1949, two in 1950, and three in 1954, when the incidence of rheumatism was highest. Comparing the figures for 1960 (Fig. 2) with the previous 12 years, it will be seen that the admissions in the first four months of this year exceed the yearly total in respect of first admissions for each year except 1950 (20 admissions, of which 2 were recurrent attacks). The cases we are seeing now presented at a time of almost full employment, good standards of housing, and during an exceptionally mild spring, following the hot, dry summer of 1959. A recent reply in "Any Questions?" (May 21, p. 1583) states that "the declining incidence (of rheumatic fever) in this country in the last few decades is undoubtedly due to less overcrowding." Our findings suggest that, although we may have been able to reduce the relapse rate by regular prophylactic penicillin, prevention of the first attack had not been achieved.

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
JAN.		♀♀	♀♀		♀		♀♀		♀♀	♀♀	♀	
FEB.	♀		♀	♀♀		♀♀	♀	♀	♀			♀
MARCH	♀	♀♀	♀♀	♀	♀	♀						♀♀
APRIL	♀♀	♀	♀				♀					
MAY		♀♀	♀♀♀			♀	♀♀		♀			
JUNE		♀	♀♀		♀♀	♀♀	♀♀					
JULY	♀♀	♀	♀♀		♀		♀♀		♀			♀
AUG.					♀		♀♀♀		♀♀	♀		
SEPT.	♀♀			♀			♀					
OCT.			♀♀	♀♀	♀			♀				♀
NOV.	♀	♀♀♀♀	♀♀♀	♀	♀		♀♀♀	♀	♀			♀♀♀
DEC.	♀	♀♀♀	♀	♀	♀	♀		♀			♀	
Total	10(2)	16(2)	20(2)	8(0)	9(1)	7(1)	17(3)	4(0)	8(1)	3(0)	2(0)	8(0)

Readmissions included in total figures and shown in brackets.

FIG. 1.—Acute rheumatism and chorea: patients admitted to the Children's Department, United Oxford Hospitals, 1948–59.

1960

JAN	♀♀♀♀
FEB	♀♀
MARCH	♀♀♀
APRIL	♀♀♀♀♀♀
Total admissions	15 (0)

FIG. 2.—Acute rheumatism and chorea: patients admitted to the Children's Department, United Oxford Hospitals, January to April, 1960.

Coburn,[3] whilst still recognizing the haemolytic streptococcus as "the factor of infection in the rheumatic state," now considers that the known association between poverty and rheumatism in the past depended on low egg consumption amongst children of the poor. Studying the children in the Stockyard area of Chicago who have continued to live in the same housing conditions and to be subject to streptococcal infections, he found that an increase in family income coincided with a disappearance of fresh cases of rheumatism. Further investigation showed an association between rising income and increase in egg consumption amongst the children, and he demonstrated an alcohol-soluble fraction of egg yolk as the anti-allergic component which he considered responsible for the improvement.

A review of the small series of 15 cases of acute rheumatism and chorea seen in the children's wards in Oxford in the first four months of the year has shown the following: (*a*) *Housing.*—One child came over from Eire on the death of her mother in 1957 and has been living in a children's home run by nuns in the city. One has been living in a house on a new council estate where there are seven children, the mother is again near term, and the house already resembles a slum; and another lives in an improvised hutted camp. The remaining twelve families are well housed with a high standard of home care. (*b*) *Family History.*—One child is adopted and the family history is unknown. Little is known of the mother's side of the family in the child from Eire and another story is indefinite. Of twelve whose background is known, six were completely negative, whilst six have a definite family history. In one this involves the father's brother; in another the mother has had two attacks and her father also had acute rheumatic fever; in another family one sib was under our care with carditis at the age of 6 (ten years ago) and the father's father had two attacks. In the remaining three cases acute rheumatism had occurred in the mother in one, in the mother and her mother in another, and the child's first cousin (father's nephew) in the last case. (*c*) *Diet.*—The child in the convent was difficult over food; the children's diet in the home "usually contains three eggs a week." A child living in slum conditions "may get two to three eggs when we can afford it." Eleven children are living in prosperous homes, but all dislike eggs. Four have about one a week or less. Typical stories are given: one "might dip bread and butter in the yolk but often would not eat them at all"; one "might eat two to three a week but did not like them"; another had "always been awkward over eggs and would not eat them," and the same applied to his sister as a small child when she had rheumatic fever although she likes them now at the age of 16. One child has an excellent appetite for everything else, but "practically speaking has never eaten eggs except occasionally a little yolk on bread and butter." It is interesting that two of these children surprised their parents by starting to like eggs whilst in hospital. Two patients of one of us (H. E.) are exceptional in that one is said to have an egg a day and another to take

about six a week. As the children are not at home at the present time it is not possible to use Coburn's questionnaire booklets to cover a seven-day period and re-check them at an interview.

Other Conditions

Consideration of certain other conditions makes it difficult to predict hospital requirements for children. The increase in staphylococcal infections is well recognized, and resistant strains are appearing amongst the general population. Procedures aimed at reducing the staphylococcal carrier rate in mothers and babies have been accompanied by a rise in monilial infections (B. Corner and W. A. Gillespie, before a meeting of the Association of Clinical Pathologists[4]). A detailed study from Newcastle (Gardner *et al.*[5]) made during the first half of 1959 showed that of 146 children admitted to hospital with viral and bacterial respiratory infections there were 6 deaths (5 under 6 months of age) and 13 severe cases (9 under 6 months), and figures from Birmingham (Disney *et al.*[6]) suggest that we have, as yet, little or no specific therapy for babies with epidemic bronchiolitis. Furthermore, there is no sign of a decrease in the incidence of certain viral and bacterial infection of the central nervous system although optimum treatment of the latter greatly reduced the risk of sequelae.

The overall improvement in children's health has been outstanding, but some small part of this may have been associated with the natural history of disease. We believe that recently the streptococcus has been both more prevalent and more virulent in this area and children's diets perhaps not quite as good as in the immediate past. The mother has had more money to spend, but, as a result of skilful advertising, she has found it difficult to choose a good diet and often she has been less ready to resist the clamour for sweet drinks and lollies. In these circumstances the egg loses favour; it does not come "packaged" with the free gift of a plastic Red Indian for the child or a set of tea knives for his mother.—We are, etc.,

VICTORIA SMALLPEICE.
HUGH ELLIS.

Radcliffe Infirmary,
Oxford.

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Elimination of Tuberculosis

SIR,—In my opinion an unnecessarily large reservoir of tuberculosis will continue to be ignored, or at least tolerated, in this country as long as tuberculous disease of the lung variously designated as "quiescent" or "inactive" or "dormant" is followed-up *without* chemotherapy. Worse still, should such cases be considered to have remained unchanged over a period of five years then they cease automatically to be followed-up. Yet from the ranks of these cases there will inevitably arise individuals who will swell the number of fresh notifications in the older age groups in the years ahead. Professor A. B. Semple (May 14, p. 1499) states that one interesting aspect of the Liverpool M.M.R. campaign of February and March, 1959, was the number of cases previously known whose lesions on radiographic examination showed signs of renewed activity *after they had been removed from the register* (my italics). Furthermore, I submit, a diagnosis of healed pulmonary tuberculosis should not normally be made on a postero-anterior chest radiograph alone, as would appear to be not infrequently the case, but only after tomography and skilled bacteriological testing which includes culture of well-taken laryngeal swabs and gastric washings.

As I see it, too often to-day are certain cases of tuberculosis assessed and managed in a manner which was understandable in the pre-chemotherapeutic era but which is inexcusable to-day. The time is ripe for the United Kingdom authorities to pronounce on the recommendations of the U.S. Public Health Service and the National Tuberculosis Association—namely, "that chemotherapy be applied primarily as a public health control measure" and that all resources should be mobilized "for a widespread application of the scientifically demonstrated and medically accepted procedures of adequate chemotherapy."[1] In my view a lead is required from the Medical Research Council and the British Tuberculosis Association as to what constitutes "active" pulmonary tuberculosis, and, better still, as to when and what chemotherapy (and chemoprophylaxis) should be carried out and for how long.[2]—I am, etc.,

Bordon, Hants. JOHN MACKAY-DICK.

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Addiction to Alcohol

SIR,—Recent correspondence in this journal and elsewhere reflects widespread concern about the part played by alcohol in road accidents. Welcome suggestions have been made for treatment centres. In fact, without preliminary preparations, the value of such centres would be grievously limited. There is at present no obligation on a person who is, or who is on the way to becoming, an addict to alcohol to enter or to remain in any centre.

Most doctors know that the drunken driver is but a small part of the alcohol problem. He may destroy one or two people in a car smash, and get into the news; but for one such there are scores who are steadily destroying themselves, their family life, and the amenity of their neighbourhood. Some have become addicts through circumstance; many have inherent defect of character. In either case, before long, they become unsuitable judges in their own cause. There is a current reorientation towards control in mental ailment; relaxation of control will, we hope and expect, become more selective, and not merely less general.

Much is to be gained by adequate treatment in established cases of alcoholism; much lost where treatment is inadequate; but the greatest gain of all is where addiction is prevented. Preventive medicine is almost invariably unpopular, to begin with. There is a cry sent up about the liberty of the individual; people deny indignantly that they require control, whether it is a question of carrying vermin or of inadequate sanitation. Ultimately, after patient persistence and legislative control, the danger is eradicated. Persuasion is and should be the normal process; the law, in the background, is for those not amenable to reasonable advice who persist in creating danger for themselves and others. This is a question worthy of close attention and wholehearted effort by the British Medical Association. From none would a lead be more appropriate.—I am, etc.,

North Uist. ALEX. J. MACLEOD.

Diarrhoeal Diseases

SIR,—While I agree with Dr. Paula H. Gosling's letter (May 28, p. 1660) on diarrhoeal diseases, there is one point she appears to have overlooked. This is the dissemination of diarrhoea by the lack of simple hygiene in the home. I refer to the appalling, insanitary methods of dish-washing and lack of hand-washing prevalent in the majority of households. "Our first step" should be to educate the public to wash its hands before handling food; to wash-up efficiently in *hot* water; and to destroy that abominable bacterial reservoir, the sink tidy. Then, I am sure, the incidence and spread of diarrhoea would be reduced and our summer epidemics would largely disappear.—I am, etc.,

Cardiff. H. CAIRNS.

E.S.R. in a New Dress

SIR,—Dr. J. B. Dawson's "The E.S.R. in a New Dress" (June 4, p. 1697) is not quite this season's model, since his conclusions confirm our own observations on the sequestrene-citrate E.S.R. published over a year ago.[1] Earlier this year, in this journal,[2] we also drew attention to the retarding effect on the E.S.R. of allowing blood to stand at room temperature when the sequestrene-citrate technique was used. We concluded that not more than six hours should elapse from the taking of the sample to the setting up of the E.S.R. estimation, if the blood was left at room temperature, but we had previously shown that the E.S.R. did not slow if the blood was kept in the cold for twenty-four hours.[1]

We feel unhappy about the technique Dr. Dawson recommends, believing it to be an unnecessary sophistication. With a simple plumbline on the conventional stand there need be no doubt about the verticality of the blood columns. Once the sequestrene-citrated blood is in the tube what is needed is dexterity, and in our view the customary technique requires less of this than the Edinburgh modification.

Many workers have already pointed out the advantages of using sequestrene in a routine haematological service.[3–5] Our own contribution was the sequestrene-citrate modification of the Westergren technique, and it is good to know that our Edinburgh colleagues have now found it as satisfactory as we have done over the past two years. What you described (June 4, p. 1717) in your leading article as "one of the latest" modifications of E.S.R. techniques has in fact been in use in many laboratories and side-rooms for a considerable time.—We are, etc.,

IAN D. MELVILLE.
Glasgow Royal Infirmary, BASIL M. RIFKIND.
Glasgow, C.4.

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Treatment of Bell's Palsy

SIR,—A woman cleaner (50 years) in the Department of Pharmacology developed Bell's palsy about four years ago. The condition persisted during four weeks. She was then given 100 mg. vitamin B_1 ("benerva" tablets) twice daily by mouth. The palsy disappeared in three days and did not return.—I am, etc.,

Oxford. J. H. BURN.

SIR,—I was interested in the article by Mr. G. A. Dalton on Bell's palsy (June 11, p. 1765). I was surprised that no mention has been made of treatment with cortisone in the early stages of the disorder. I have not treated many cases of Bell's palsy, but was introduced to this method of treatment during a period in North America. High doses of cortisone are given for the first few days, the dose being rapidly reduced so that after about two weeks the course has been completed. Since the essential pathology seems to be compression of the nerve due to oedema which is likely to be inflammatory, this method of treatment in the early stages might seem worth a clinical trial.—I am, etc.,

Hythe, Hants. G. MATTHEWS.

Trachoma Virus

SIR,—The annotation on "The Trachoma Virus" (June 11, p. 1798) may engender misleading impressions about current researches on trachoma vaccine, particularly among those unfamiliar with the virological problems involved. Discussing the question of polyvalent vaccine, reference is made to the studies of Bell, Snyder, and Murray[1] on neutralization of the toxic effect of trachoma virus injected intravenously into mice. Their finding that certain strain differences can be detected in this way is of great importance, but it is not justifiable to assume, as your contributor does, that these results also apply to neutralization of infectivity for the human eye.

The significance of the protection experiments in monkeys reported by Grayston and co-workers[2] is hard to assess, since only six animals (including controls) were used to test two different vaccines. Furthermore, establishment of specific infection in the control monkeys was apparently not confirmed by virological tests; such confirmation is always desirable since monkeys vary in susceptibility to trachoma virus, and are commonly subject to non-specific conjunctival folliculosis, which may confuse the interpretation of results.

The annotation summarizes the results obtained in human adults with the bald statement that "an inactivated vaccine was as effective as a live vaccine, but that the best results were obtained with an aluminium-particle vaccine." It should be made clear that in the original paper this refers only to formation of complement-fixing antibody, and not to immunity to infection. The results of protection experiments in children are still awaited. These comments in no way detract from the value of the American workers' field studies, which, as they themselves state, "are designed for long-term follow-up investigation." I write only to emphasize the danger of extrapolating results obtained with toxin-neutralizing or complement-fixing antibodies to the prevention of infection in man.—I am, etc.,

M.R.C. Trachoma Research Group, L. H. COLLIER.
Lister Institute of Preventive Medicine,
London, S.W.1.

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Age/Sex Structure of Practice Populations

SIR,—By the methods suggested in the report of the M.R.C. Committee for Research in General Practice (May 14, p. 1496) it is difficult to see what advantage they have over a simple analysis of the record envelopes at any time. On the other hand, if the methods had been adopted in July, 1948, it is difficult to know how one could determine the sex/age structure of one's panel in, say, August, 1953. Might I suggest the adoption of a method, which I used over many years, to determine the number of hospital in-patients at any given time?

Use graph paper ruled in millimetre squares, the horizontal lines to represent numbers and the vertical time, 1 millimetre representing a month. A patient on admission would be marked by a point on a line and his removal by another point. Joining these two points would indicate the length of time on the panel, black ink being used for males and red for females. The age on admission must be written beside the admission point and the length in millimetres to any given point would determine the age at that time.

Two separate 5 × 3 in. (12.7 × 7.6 cm.) card-index systems would be necessary to locate the personalities indicated by the lines on the chart. The one would be alphabetical and would record the name of the patient, identity number, the number of his personal history-sheet, and the number of the line on the chart. The other would be numerical and would record the personality indicated on the chart by the line over any period of time by recording history-sheet numbers with dates of admission and removal.

Thus making use of names from the M.R.C. Committee's Figs. 1 and 2, William John Kemp's stay on the panel would be indicated by a black line joining two points on, say, line 1024 between June, 1955, and July, 1959, and Josephine Edwards by a red line between April, 1950, and May, 1958, on line, say, 512. At the beginning of these lines would appear the ages of 58 and 53 respectively. A vertical count of the red and blue lines in August, 1953, would give the sex structure of that month, and a millimetre tape measurement of the length of all lines crossing August, 1953, would give the mean age structure of the panel.

Like most of my medical friends I have strong objections to merit awards, but, if these awards are to be based on scientific investigations rather than "kissing goes by favour," then in fairness to single practitioners and expert panel practitioners perhaps the M.R.C. would now turn its attention to the following considerations—namely, that the apparent morbidity rate of a panel practice to the real morbidity rate of a population varies directly with the density of the population and the consulting rate of the doctor and inversely as the scatter of the practice.—I am, etc.,

Halifax, Yorks. A. GARVIE.

Disfiguring Tattoo

SIR,—The enclosed photographs are of the neck of a young married woman, aged 20, who was admitted to hospital suffering from lower abdominal pain due to pelvic cellulitis. Her condition subsided with the aid of antibiotics. It was noticed in the ward that she kept her neck covered with strapping, and she confided in the ward sister that this covered a tattoo mark of which she was very much ashamed (Fig. 1). She informed me that it had been done in this country when she was 18 years of age. She was very much relieved when she was told that it could be removed in, at least, two stages.

As she was under age a permission form had to be filled in, though I gather that similar permission was not required for the tattooing. The first operation was carried out by excision of the upper part of the mark, with a collar incision (Fig. 2). The second operation for the removal of the dagger was in a less favourable position, and the scar is consequently more noticeable (Fig. 3). She is, however, delighted with the result, and her outlook towards men has improved.—I am, etc.,

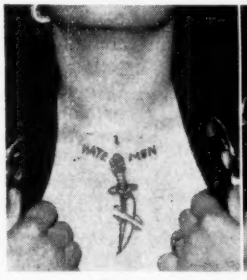

FIG. 1

FIG. 2

FIG. 3

SURGEON.

Recruitment and Training of Nurses

SIR,—Mr. H. W. Gallagher's letter concerning "Nurse Training and Recruitment" (June 4, p. 1733) contains some very intriguing suggestions. As I see it, Mr. Gallagher visualizes a single entrance to nurse training, and would replace the two present training courses with a preliminary shorter practical course which all trainees must tackle in the first instance and which leads to State Registration (S.R.N.), this to be followed by a more advanced course of training leading to State Registered Staff Nurse (S.R.S.N.) for those who are considered suitable and who wish to go forward in their profession.

The difficulty here is with recruitment. In the case of the medical profession there is a single entrance and no important lack of recruits. Unfortunately recruitment for the nursing profession is much more difficult and uncertain owing to the keen competition from business, educational, and other careers which are well remunerated and offer regular hours and free week-ends. Also there is the "gap" between school-leaving age and 18 years when nurse training is allowed to start. It is now fully realized how essential it is for the welfare of the nursing profession to attract the brightest and best—the university minded—of our school-leavers, and it is with this in mind that the minimum educational standard at entrance to the present students' training course has been proposed for 1962, and which will be the entrance to a sufficiently comprehensive and academic course of training to produce a nursing grade able to face up to the high techniques of modern medicine, surgery, and research; and it is hoped that this more advanced training group will be the nursery of the future leaders, teachers, and administrators of the nursing profession.

The hope that the higher initial educational standard will increase recruitment for the students' course is, of course, highly problematical, although the possible reduction in "wastage" during training—approximately 30%—is not unlikely as there will be a better selection of candidates and less tendency to "give up." The G.N.C. well understands the risks, and indeed its recent policy is to reduce the number of training schools for the students' course—

"quality rather than quantity"—and increase the relative number of assistant nurse training schools.

Whether future recruitment and training develop on the lines suggested by Mr. Gallagher or in some other form, it is abundantly clear to all—as in fact it has been during the past ten years—that we must have a large increase in practical basic nurses who are fully entitled on their own merits to be called "nurses" and will always form a most important and essential part of the nursing profession. Unfortunately recruitment for the present assistant nurse training course is insufficient to meet these urgent needs, and the reasons for this are no doubt many, but some seem to me to be quite obvious. While the title "assistant"—assistant to whom or to what?—remains, and while, as Mr. Gallagher points out, the course leads by law to a "dead end," it is obvious that neither the applicant nor her parents are likely to be enthusiastic about it as a career. Also, and more important, it is essential that those who take this shorter and basic practical course of nursing should at least be allowed to look forward to the possibility of advancing to higher posts in their own hospitals or at other hospitals and institutions dealing with the type of work for which they have been specially trained and are specially suited by experience.

Basic practical nursing has little to do with scientific knowledge and academic attainment. It has on the other hand a great deal to do with qualities of personality, character, and kindliness which are to be found in all grades of society. The present regulations governing the training, title, and future prospects of our present assistant nurses are morally unfair and hopelessly out of date.—I am, etc.,

Leeds. C. W. VINING.

Gastro-intestinal Symptoms in Bronchial Carcinoma

SIR,—I read with interest the article, "Carcinoma of the Bronchus Presenting with Gastro-intestinal Symptoms," by Mr. E. J. M. Weaver and Dr. R. H. Balme (May 21, p. 1543), because we had a similar patient a few months ago who presented great diagnostic difficulties.

A man of 67 was admitted here on December 31, 1959, under Dr. D. N. Dobbie, complaining of some left-sided chest pain and dyspnoea, but mainly of anorexia and some vague dyspeptic symptoms. His sputum was purulent, but both this and the pyrexia cleared up readily with penicillin. Chest *x*-ray was clear. His general condition continued to deteriorate and he continued to complain of anorexia and abdominal discomfort and distension. A carcinoma of the stomach was suspected, but barium meal was negative except for a coarse, irregular, mucosal pattern. The duodenal curve appeared slightly widened. Another barium meal was taken some time later, but the findings were exactly the same. A barium enema was also negative. His liver-function tests were normal apart from an alkaline phosphatase of 25 units and a serum bilirubin of 1.4 mg./100 ml. Another chest *x*-ray was taken, and the lung fields were again reported as clear. The patient's condition deteriorated and he died on February 8.

Post-mortem examination was carried out, and an oat-celled carcinoma was found, involving the right main upper-lobe bronchus. The stomach was normal. The liver was studded with large secondary deposits. The pancreas was normal, but the lymph nodes along its upper border and along the common bile ducts were greatly enlarged with secondary deposits. A chronic duodenal ulcer 1 × 1.5 cm. in size, eroding the posterior aspect of the duodenum into the pancreas, was also present.

In this case the gastro-intestinal symptoms overshadowed the respiratory symptoms, and the lack of radiological evidence in the chest *x*-rays helped to divert our attention away from the lungs.—I am, etc.,

Farnborough Hospital, Kent. J. MUSCAT-BARON.

Treatment of Anorexia Nervosa

SIR,—Drs. Peter J. Dally and William Sargant's interesting paper (June 11, p. 1770) contains an inadvertent inaccuracy. Quoting a report from this department,[1] subsequently presented as a definitive communication,[2] they describe our results as a weekly weight gain of 1.9 lb. (0.8 kg.) over nearly 150 days. Our report covered a series of 19 admissions for 13 patients over a period of eight years. Adopting their own method of regarding readmissions as fresh cases for calculating results, the average duration of admission for our series would have been roughly 100 and not 150 days.—I am, etc.,

York Clinic, Guy's Hospital, London, S.E.1. D. STAFFORD-CLARK.

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SIR,—While Drs. Peter J. Dally and William Sargant should be complimented on their tenacious efforts at overcoming the syndrome of anorexia nervosa (June 11, p. 1770), much of their work would appear simply to be a preliminary treatment of this problem. For example, no attempt is made to explain the psychological implications of the condition they are treating, and the facile statement is made: "... and supportive psychotherapy with the patient in a remission *seems* (my italics) valuable in preventing relapse." Patients have only been followed-up for one year.

Physicians treating this illness must be impressed by the primary consideration of the anorexia. The patient is trying to get rid of something. This "something" is always dependent upon emotional childhood problems. The fact that almost all patients are women, constipated and amenorrhoeic, cannot be ignored. Some attempt must be made to analyse attachments to the parents, particularly the father, and oral and anal problems will need to be discussed. In other words, the psychic component must be explored in order to release the somatic necessity. Drs. Dally and Sargant's treatment by the combination of insulin and chlorpromazine will produce the remission which is so necessary for the cure of the condition. We must then get down to the cause, and this is the most difficult part of treatment, seemingly constantly ignored by present-day physicians. An attempt must be made to give the patient insight and a reasoned explanation of their necessity for the anorexia, otherwise relapse is certain or another psychosomatic problem will have to be tackled.

It is dangerous to preach that anorexia can be "cured" only by drugs. A combination of medicine and psychotherapy *must* always be used and the implications of the illness made thoroughly conscious to the sufferer.—I am, etc.,

London, W.1. GORDON AMBROSE.

Androgenic Steroids and Liver Function

SIR,—Since methyltestosterone was introduced to clinical medicine by Foss[1] many cases of cholostatic jaundice have been reported. Foss and Simpson[2] reviewed the literature and concluded that, in view of the widespread use of methyltestosterone, the rarity of this complication, and its apparent transient character, there was no evidence to justify withholding therapy with methyltestosterone. It is of interest that other

C_{17}-substituted androgenic steroids (17-α-ethyl-19-nortestosterone[3 4] ; 17 - α - methyl - 19 - nortestosterone[5]) may produce intrahepatic cholostasis and jaundice. Free testosterone and testosterone propionate are not believed to cause this syndrome. In addition, only C_{17}-substituted steroids may produce abnormal bromsulphthalein retention in the course of treatment without other clinical signs of hepatic dysfunction.[6]

In a study of new synthetic anabolic steroids for toxic effects on the liver we investigated 1-dehydromethyltestosterone, 9-fluor-11-hydroxymethyltestosterone, and 19-nortestosterone-phenyl-propionate. Both the derivatives of methyltestosterone were given in 10 and 8 patients without prior liver dysfunction in daily doses of 25 mg. for three to four weeks. They produced in all cases abnormal bromsulphthalein (45 minutes) retention (up to 31%) and in some slight elevations of serum glutamic-oxalacetic transaminase (up to 78 units). Alkaline phosphatase, serum bilirubin, cadmium, and thymol turbidity tests remained unaffected. No clinical signs of liver disease were observed. In additional trials daily 10- and 50-mg. oral doses of dehydromethyltestosterone were given to 11 other patients. It was shown that there was a definite relation between the dose given and the extent of bromsulphthalein retention and transaminase activity. In a comparative study with nortestosterone-phenylpropionate, 25 mg. given daily by intramuscular injection, bromsulphthalein retention values and transaminase levels remained within normal limits in all nine cases.

It may be concluded from these results that differences in metabolism between C_{17}-substituted testosterones and testosterone-esters are responsible for the impairment of liver-function tests. It is possible that unknown intermediary metabolites of the steroids play a role because abnormal bromsulphthalein retention can be observed only 2–3 days after the beginning of therapy. In view of the definite intrahepatic cholostasis we believe bromsulphthalein retention and elevated enzyme levels indicate early biochemical changes of the metabolism of the liver cell. On the other hand, since a correlation between dosage and magnitude of the test changes was found it seems evident that intrahepatic cholostasis following the administration of certain androgenic steroids is not a hypersensitivity or allergic reaction. This opinion is supported by histological findings of Schaffner *et al.*[4] From a practical point anabolic steroids without side-effects on the liver should be preferred, especially for long-term treatment.—We are, etc.,

H. WERNZE.
H. J. KUSCHKE.

Medizinische Univ.-Klinik,
Würzburg, Germany.

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Diabetes Mellitus in the Bantu

SIR,—I beg to refer to the article by Drs. W. M. Politzer, B. Hardegger, and T. Schneider on the incidence of diabetes mellitus in the Butha-Buthe District of Basutoland (February 27, p. 615). During my late practice of about four years in different rural parts of the Sudan I observed that the incidence of diabetes mellitus among rural patients was not identical in all parts, as the rate of hospital attendance varies with the belief of the population in modern medicine or their indulgence in traditional medicine. However, in areas where patients attended nearly at the same rate as in urban hospitals I was particularly attracted by the fact that the incidence of diabetes mellitus was not much lower than among urban patients, at least not as low as the ratio 0.23% to 1.7% stated in the above-mentioned article.

Moreover, our rural people live entirely on carbohydrate diet, formed mainly of flour and milk, and when they shift to an urban life their diet is still very rich in carbohydrate, rich in proteins due to the relatively very low cost of meat, and poor in fats.

Familial predisposition was more attractive to me as a precipitating cause of diabetes than any change in the constitution of diet, and in most rural diabetics the body-content of fat was very low. Although I agree that the shift from rural to urban life is followed by a rise in diabetes incidence among the population, it impresses me very much that the stresses of life and the varied distractions and obligations are more to blame than any dietetic factor. Thus I endorse the necessity for further and wider studies.—I am, etc.,

Shendi, Sudan. F. N. SHAMSEDDIN.

Delay in the Third Stage

SIR,—Dr. P. M. Elwin in his letter (May 21, p. 1569) wonders why the Brandt–Andrews method of delivering the placenta is not taught in medical schools. The technique is, in fact, taught at University College Obstetric Hospital. The Brandt–Andrews manœuvre was first used in 1957 by the house-surgeons when they were called to a case where the placenta was retained. The placenta was delivered by this method in a surprisingly large number of cases, and manual removal of the placenta was thus avoided.

In 1958 the method was adopted as a routine method of delivering the placenta. The patients are given 0.5 mg. ergometrine intravenously with the delivery of the anterior shoulder. The placenta is then delivered by controlled cord traction (a slight modification of the Brandt–Andrews manœuvre) as soon as the baby has been attended to and provided that the uterus has contracted well.

In the first 421 normal deliveries in which this technique was used, the rates for manual removal of the placenta and for postpartum haemorrhage were both 1.4%. In 82.5% of the cases the placenta was delivered within five minutes of the birth of the baby, and in 93% of the cases the blood loss was less than 284 ml. (10 oz.). These cases were reported by Professor W. C. W. Nixon at the Royal Society of Medicine and are recorded in the Proceedings of the Society.[1] Controlled cord-traction is easy to perform ; it is painless for the patient, and is liked by both the medical and nursing staff. A larger series of cases treated by this method will be reported shortly.—I am, etc.,

PAMELA M. BACON.

University College
Obstetric Hospital,
London, W.C.1.

REFERENCE

1 Nixon, W. C. W., *Proc. roy. Soc. Med.*, 1959, **52**, 566.

How Dangerous are Microwaves ?

SIR,—In your annotation entitled "How Dangerous are Microwaves ? " (May 7, p. 1420), you refer to the nuclear effects on root-tips observed by Heller and Teixeira-Pinto,[1] and to my criticism[2] that their technique did not permit any conclusions concerning the thermal or non-thermal nature of these effects. You refer to the magnetic orientation effects of microwave radiation on suspensions of micro-organisms, and the disrupting

effect of heat on such orientation, implying that heat is unlikely, therefore, to be responsible for the nuclear effects mentioned above.

I should like to point out that the magnetic orientation effects are seen with suspensions of micro-organisms, blood cells, oil droplets, etc., in a homogeneous, non-viscous, aqueous medium.[3] The disturbing effect of heat is presumably due to the increased Brownian movement in such a medium. The interior of a living cell, on the other hand, is a distinctly non-homogeneous system of considerable viscosity. During mitosis, the chromosomal movements are guided by highly organized ultramicroscopic structures. I am aware of no sound evidence to indicate that microwaves can produce magnetic orientation effects upon chromosomes within living cells, or even upon blood cells subjected to the turbulence of circulation *in vivo*. Therefore it seems unjustified to explain the observed morphological deformities of root-tip nuclei on the basis of postulated magnetic orientation of chromosomes. Thermal effects seem to me a more plausible explanation.—I am, etc.,

H. KALANT.

Department of Pharmacology,
University of Toronto,
Canada.

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[1] Heller, J. H., and Teixeira-Pinto, A. A., *Nature (Lond.)*, 1959, **183**, 905.
[2] Kalant, H., *Canad. med. Ass. J.*, 1959, **81**, 575.
[3] Schwan, H. P., *Proceedings of Second Triservice Conference on Biological Effects of Microwave Energy*, U.S.A.F., Rome, N.Y., July, 1958, p. 33.

First-aid in Aircraft

SIR,—I am very interested to see that Dr. F. Reynolds has suggested (June 4, p. 1739) that the whole subject of medical aid for aircraft passengers should be reviewed, apparently as a result of an unfortunate personal experience in the near East. He appears, however, to have made this suggestion without any prior reference to an airline medical department.

In B.O.A.C. we have the question of medical and first-aid equipment in aircraft constantly under review. Although the number of occasions when morphine has to be administered are relatively few, we carry a small supply on all our aircraft in a sealed emergency medical kit which can only be opened on the authority of the captain-in-command. The details must be entered in the aircraft technical log stating the place, time, and circumstances of the incident. All our cabin staff receive instruction in the method of administering morphine by the use of dummy ampoules. As an added safeguard contraindications to giving morphine are clearly stated on the specially sealed container and only single-dose ampoules are used. Although the justification for opening this special first-aid outfit must rest with the captain of the aircraft, he will naturally be guided by any doctor or nurse who may be travelling on board, or following advice obtained by air-to-ground communication.

As well as the morphine, the emergency kit contains many items of medical equipment which might be required in emergency affecting aircraft passengers individually or collectively. There is also a medical holdall provided for cabin staff containing simple medicaments and dressings which may be required on a day-to-day basis by the normal passenger complement. We would therefore like to assure Dr. Reynolds that in B.O.A.C. we are fully alive to this problem.—I am, etc.,

London. K. G. BERGIN,
Director, Personnel and Medical Services,
British Overseas Airways Corporation.

SIR,—I have read with considerable interest Dr. F. Reynolds's letter (June 4, p. 1739) relating to first-aid kits, and in particular the carriage and administration of morphine in civil aircraft. As his experience did not appear to relate to this airline I take leave to make the following points:

(1) Some time ago the International Civil Aviation Organization (an inter-governmental body) studied the question of first-aid kits and their contents in respect of civil aircraft and made recommendations accordingly.

(2) It is the responsibility of each member government to interpret and apply such recommendations as are considered appropriate within the country concerned.

(3) The United Kingdom, through the Ministry of Transport and Civil Aviation, ratified such recommendations and issued regulations, which currently read as follows: "First-aid kits shall contain equipment suitable for rendering first aid in any accident that may occur and sufficient for the purpose having regard to the number of persons on board the aircraft and shall include the following items: *Materials:* Bandages, triangular bandages, absorbent gauze, adhesive plaster, white absorbent lint, cotton wool (or wound dressings in place of these two items), burn dressings, safety pins. *Instruments:* Haemostatic bandage or tourniquet, scissors. *Drugs:* Antiseptic, analgesic, stimulant." (Air Navigation (General) Regulations, 1954, No. 925. Effective August 1, 1954.)

(4) The British civil airlines (both national corporations and the independent airlines) are free to interpret the regulations to include morphine if adequate control to the satisfaction of the Home Office can be ensured.

(5) Because of the pilferage potential of morphine in certain countries strict methods of control of this drug have to be maintained. Since the formation of the corporation in 1946 all B.E.A. aircraft have carried emergency first-aid kits, the contents of which are in excess of the mandatory requirements and include "tubonic" ampoules of "omnopon." These kits are under the personal control and jurisdiction of the pilot of the aircraft and should not be confused with the "medical roll" containing simple dressings and medicaments (including analgesics), which, in addition to the aforementioned emergency kits, are carried in the care of the air steward or stewardess on duty. They are intended for use in the treatment of minor conditions only.

(6) Should a severe emergency occur in flight the captain can authorize the use of the emergency first-aid kit and if necessary the breaking of the seal in the special compartment housing the morphine. All cabin staff are trained in its administration, but the help of a doctor if on board is normally sought on such occasions. (It is interesting to note how often there is a doctor/passenger on board an aircraft when an emergency arises.)

(7) The captain authorizing the use of the emergency first-aid kit and/or morphine has to render a full report of the incident precursory to such action. If any morphine is used the incident is reported to the Home Office by the airline medical officer designated as responsible for the issue and control of such emergency supplies.

During the past fifteen years British European Airways Medical Services have operated a strict control and regular inspection of the contents of all aircraft first-aid kits. By such means, it is believed, the emergency potential has been and is being adequately met.—I am, etc.,

Hounslow, Middlesex. A. BUCHANAN BARBOUR,
Director, British European Airways
Medical Services.

Tendinitis, Peritendinitis—or Paratenosynovitis ?

SIR,—I have read with interest the letters from Dr. C. Landon Smith (March 12, p. 806) and Dr. D. C. Smith (May 7, p. 1429). Since publishing my article on this subject[1] I have seen some 40 cases a year with this lesion at the wrist, together with a similar number of lesions

around other tendons—extensor digitorum, tibialis anticus, peronei, and the tendo achillis. All these tendons have no tendon sheath but are covered with paratenon. I showed that injections of fluid deep to the paratenon of the extensor carpi radialis and superficial to the tendons produced a swelling running up and down the tendon from its origin to their insertion into the metacarpals, presumably in the space between the paratenon and tendon. If the paratenon is dissected away in fresh post-mortem material, the tendons are seen to be covered with glairy (? synovial) fluid. Presumably the paratenon secretes this fluid into the space around the tendon, producing the mechanism whereby the movements of the tendons in the surrounding tissues are lubricated. Thompson *et al.*,[2] reporting on biopsies taken from clinical lesions, showed that the pathological changes with excessive secretions of fluid were confined to the paratenon. These findings suggest that the proper name for this lesion is paratenosynovitis.

In treatment, our experience would confirm that complete immobilization by a full plaster cast produces many recurrences. Since it is accepted that one of the causes of the lesion is a return to manual activity after a break due to intercurrent illness or industrial stoppage, this is only what would be expected. At the wrist, inefficient immobilization probably acts by preventing hyperextension, which is one of the factors producing the lesion. In this department, no immobilization is used. The patient is directed to continue at work and is instructed to rub the affected area firmly but gently twice daily with ung. iodii (*B.P.*). Cyriax[3] recommends deep massage only. The patient is promised complete freedom from pain and disability by the end of 10 days. Two patients in nine years were disappointed, one requiring 12 days and the second 21 days for complete relief. One patient had a bilateral lesion and on one side hydrocortisone injections were given. If anything, the hydrocortisone took longer than the routine massage.

Tendo achillis paratenosynovitis has been seen as a complication during the treatment of sprained ankles (a number of cases have been seen *de novo*). If elastic strapping is applied to the ankle, so that the first layer has its slightly rough lower edge lying just above the insertion of the tendon, then every time the ankle is plantar flexed this rough edge may dig in and irritate around the tendon. If the first layer of strapping is applied to the point of the heel, the upper edge will be well above this critical area, and the number of ankles developing this lesion will be vastly reduced. If the lesion is present massage below the strapping is not possible, but relief can be rapidly obtained by placing suitably shaped pieces of chiropody felt along both sides of the tendon under the strapping.—I am, etc.,

Casualty Department,
The General Infirmary, Leeds. MAURICE ELLIS.

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[1] Ellis, M., *Brit. med. J.*, 1951, **2**, 777.
[2] Thompson, A. R., Plewes, L. W., and Shaw, E. G., *Brit. J. industr. Med.*, 1951, **8**, 150.
[3] Cyriax, J., *Brit. med. J.*, 1951, **2**, 972.

Masks or Silence

SIR,—As an ex-surgical registrar I obviously have not had as much experience as your other correspondents, but from my own observations over several years I am sure that it matters not whether one wears a mask or is silent during an operation (except during long-drawn-out neurosurgical operations). What does matter is the technique, which must be gentle and non-traumatic; if this is the case then the wounds are clean. If the surgeon is "ham-fisted" then the wounds go septic.—I am, etc.,

Cranham, Essex. G. M. M. WATTS.

Rod and Serpent

SIR,—The theory mentioned by Major-General R. E. Barnsley (May 28, p. 1654) that the "rod" was actually a mirror is interesting and plausible. The mirror since ancient times has been credited with prophylactic and therapeutic powers, particularly against the Evil Eye, presumably because it reflects the noxious beams back to their source. Small mirrors are still used to-day as amulets in the Near East.

I once observed an Arab woman flashing a mirror in the eyes of her baby grandchild. The child was said not to be the victim of the Evil Eye but to be in the possession of a dangerous Djinn. In fact it was exhibiting the typical carpopedal spasm of tetany.—I am, etc.,

Tunbridge Wells. A. CAMERON.

SIR,—Surely the answer to your correspondent Major-General R. E. Barnsley (May 28, p. 1654) is that the picture shows the original "Snake in the Glass" looking to see if his face fits for a merit award as a G.P. —I am, etc.,

London, S.W.1. A. W. SAMPEY.

Spiritual Healing in Hospitals

SIR,—Setting aside the professional aspects of the matter so widely ventilated in your columns, I find it almost incredible that the senior medical staff of any hospital should apparently have allowed their management committee to trespass into the field of their clinical charge by giving facilities to spiritual healers.

The proper course for a management committee faced with such a request would surely be to refer such persons to their senior medical staff, who would act as each thought fit. For a management committee to give any such facilities, or to make any recommendations on such a matter, would be wholly improper, and should not be tolerated by the profession.—I am, etc.,

Omagh, Co. Tyrone. J. H. PATTERSON.

POINTS FROM LETTERS

Osteoarthritis of the Hip

Dr. JAMES F. BRAILSFORD (Birmingham, 15) writes: The condition of osteoarthritis is no new malady. Signs of its existence are to be found in some of the skeletons of the most remote past, yet great men of the calibre of Hugh Owen Thomas, who achieved immortality and who has been said by competent authorities to have contributed more new things to orthopaedic surgery than all the rest since Hippocrates, did not see fit (nor did his nephew, Sir Robert Jones) to devise any surgical interference. He advocated the advice of John Hilton, who knew more about "rest and pain" than most of us. Thomas and Robert Jones believed in freedom from fear, that deformity was a physical and not a spiritual handicap, and that pleasures banish pain. Yet a study of the surgical treatment of osteoarthritis devised during the past 30 years reminds us to heed the warning words of Sir James Walton to young surgeons. He said "maybe in the life-time of many of you, these marvellously skilled operations will cease to be performed and will be regarded as curiosities of the past." How true of orthopaedic surgery of osteoarthritis.

Obituary

ALEXANDER KENNEDY, M.D., F.R.C.P., D.P.M.

Professor Alexander Kennedy, professor of psychological medicine in the University of Edinburgh and clinical director of the Royal Edinburgh Hospital, died suddenly at his home in Edinburgh on June 11. His death deprives British psychiatry of one of its most dynamic figures at the height of his powers, and is an unexpected and tragic loss to his family and to his many friends. Despite being very seriously troubled with asthma for several years, he had been actively at work in the week before his death.

Born on January 16, 1909, Alexander Kennedy was educated at the City of London School and St. Thomas's Hospital, where he won the Mead and Bristowe Medals and the Wainwright and Hadden prizes. He graduated M.B., B.S. in 1932 and proceeded M.D. in 1934, in which year he also took the M.R.C.P. The D.P.M. followed in 1936 and he was elected F.R.C.P. in 1949. When appointed to the chair of psychiatry in Edinburgh he became F.R.C.P.Ed. in 1957.

After holding resident posts of casualty officer, house-physician, and resident anaesthetist at St. Thomas's he became registrar and tutor in the children's department. When this brilliant young man showed an interest in psychiatry he attracted the notice of Mapother at the Maudsley, who invited him to join his staff after a year's study on a Rockefeller travelling fellowship in America. This year was spent at the Johns Hopkins Hospital, where Kennedy got experience of the psychiatric teaching of Adolph Meyer, and also carried out neurophysiological investigations on experimental catatonia.

When after this he arrived at the Maudsley Hospital he already showed a mind of considerable maturity. He accepted the local clinical discipline, but in the management of his patients would not brook interference which he regarded as pedantic. His independence and originality would have had more scope to influence his colleagues in the close-knit fellowship which worked at the Maudsley in those days if it had not been for the interruption of the war. In September, 1939, the entire personnel of the hospital were mobilized into two emergency hospitals, of which one was at Belmont. Here Kennedy became second in command to Dr. Louis Minski, and was concerned much more with administration and organization, and with work in the medical and surgical wards, than with psychiatry.

His restless spirit demanded action, and he showed himself abundantly capable of dealing with tragic emergency. When one wing of the hospital received a direct hit from a bomb, and three wards were precipitated on to one another, it was Kennedy who organized the rescue work of burrowing through the piled heaps of rubble and rafters and beds to bring out the patients. The raid went on, and all work had to be conducted by the light of electric torches, switched off whenever the sound of another aeroplane was heard. It was not surprising that Kennedy soon found the work of a base hospital of the E.M.S. insufficiently energetic, and he moved nearer the front line. Joining the R.A.M.C., he was the first psychiatrist to accompany parachutists, and he carried out the first research on the psychology of parachute training. With the rank of lieutenant-colonel he served in Intelligence as a general staff officer and took part in operations in the Western Desert, Crete, Greece, and Jugoslavia. Later he was scientific adviser to the Intelligence Branch of the Control Commission in Germany. His main work in the Army was done as adviser in psychiatry to the Intelligence Service in the Middle East. He was chiefly concerned with personnel selection and training, and was particularly interested in the "debriefing" of those who had returned from special operations behind the enemy lines.

With all this pressure on his time and energy he maintained his many-sided interests. He had been a boxer in his young days and was an honorary medical officer of the Amateur Boxing Association and a past-president of the International Commission on Boxing. He had also been a member of the medical executive of the Olympic Games. As Kenneth Alexander he was the writer of radio plays whose dramatic use of medical themes will be known to many, and he was also himself an effective and popular broadcaster.

Among other distinctions he won the Gold Medal of the Royal Medico-Psychological Association in 1938; he had been vice-president and president of the Section of Psychiatry at the Annual Meetings of the B.M.A.; and he was a past-president of the British Medical Students' Association. While at Newcastle he went to Australia at the invitation of the Government of Victoria to give advice on psychiatric organization. On medical subjects he wrote many articles in this and other journals, his lifelong interests being hysteria, hypnotism, the organic reaction types, and delinquency.

Kennedy's full-blooded character contained within it the complementary qualities of the man of action, the imaginative romantic, and the thinker. Probably his greatest gift was as a writer, and he excelled in the writing of a critical review or the exposition of modern thinking in a subtle and difficult field. He was a natural teacher, with a touch of flamboyance much appreciated by the undergraduate, and a lucid and impressive lecturer. As a clinician he was surprisingly sensitive to the complexities of personality, while keeping the undogmatic approach of a realist. He used his great influence to maintain the requirement that the psychiatrist should be in the first place a good doctor. His greatest achievements were in the organizational work of the departments of psychiatry at Newcastle and Edinburgh, which in neither case was he able to see through to fruition.

Endowed with a magnificent frame, he was in his youth a boxer, and had a generous share of combativeness, even aggressiveness. As the years went on he matured and mellowed, and his fundamentally gentle nature more and more shone through. Larger and larger loyalties engaged him, until his fight was all for impersonal aims. In the death of this lion-hearted man psychiatry has lost a great champion.

He was twice married, and had three sons by his first wife and one son by his second. All who knew him well will wish to give them sympathy.—E. T. O. S.

F. F. writes: When Alexander Kennedy took up his appointment in Edinburgh, he found an excellent system of formal undergraduate teaching of psychiatry already functioning. He was able to extend the teaching into the earlier part of the medical curriculum and to relate it more closely to the general medical teaching. He was an extremely stimulating lecturer, who could present even the dullest subject in a most interesting way. However, he believed that the formal lectures and demonstrations were not enough and that practical clinical instruction was an essential part of undergraduate psychiatric teaching. He reorganized the elective course in psychological medicine which was given to fourth-year students. During this course a considerable amount of time was devoted to clinical case-taking. Shortly before his death he elaborated a scheme for intensive undergraduate clinical teaching in psychiatry.

In the field of postgraduate education he made even greater efforts. He never ceased to admire the work of the excellent clinical psychiatrists who had been trained

by the apprenticeship system, which had flourished in Morningside for more than 100 years. However, he was of the opinion that, with the modern developments of psychiatry and its allied specialties, a more formal postgraduate education was necessary. He believed that university psychiatry clinics should not only offer postgraduate training to their own staff but also to the junior doctors in the mental hospitals. He therefore introduced a joint university–regional-board training scheme of this type which he had developed so successfully in Newcastle.

He built up a university department which was separate from, but closely associated with, the Royal Edinburgh Hospital for Mental and Nervous Disorders. His greatest desire was to create an Edinburgh institute of psychiatry which would be a centre for postgraduate teaching and research. Only a few months before his death he obtained a grant for the construction of a new professorial unit which he hoped would form the nucleus of the new institute.

These are only some of his achievements. He also helped to plan many advances in the mental-health services within the Edinburgh region, which are now well under way. When one remembers that Kennedy did all this while constantly troubled by ill-health, his achievements are indeed remarkable.

Personally he was an extremely generous man; meanness and pettiness were quite foreign to his nature. He always did his utmost to help the careers of his assistants. Although it was not always easy to work with him, it was impossible to do so for any length of time without developing a lasting affection for him and a profound admiration for his organizing ability.

J. C. McFEELY, L.R.C.P.&S.I., D.P.H.

Dr. J. C. McFeely, a former president of the Irish Medical Association and a member of the Council of the British Medical Association, died last month in Dublin.

John Charles McFeely was born in Dublin in 1911, his parents having come to that city from Donegal. He was educated at the Catholic University School and studied medicine at the Royal College of Surgeons in Ireland and University College, Dublin, qualifying in 1934. He took the L.M. in the following year and the D.P.H. in 1938. After holding a resident post at the Bootle General Hospital he worked for a short time as a ship surgeon before becoming assistant county medical officer of health in West Suffolk. On his return to Dublin he worked as assistant master at the Coombe Lying-in Hospital before taking up the duties of a district medical officer.

For many months before the Joint Annual Meeting of the British and Irish Medical Associations in Dublin in 1952 he worked long and hard as the general secretary of the meeting, but unfortunately fell ill just before it began. He became a member of the Council of the B.M.A. in 1955 and was still a member at the time of his death. He was also a member of the Overseas Committee. His term as President of the Irish Medical Association was from 1956 to 1957, and during Mr. Costello's Government he was nominated a member of the National Health Council.

Dr. SEAN MCCANN writes:

> "Remembrance wakes with all her busy train,
> Swells at my breast, and turns the past to pain."

Through the years comes back the memory of "Jack" McFeely's first appearance as a member of council of the Irish Medical Association. As he spoke, those who were listening realized that in this slim, boyish figure a dynamic personality had come to join their number. His clear and logical speech dominated the council chamber. As the years went by all who made his acquaintance as an active member of committee came to regard him not alone as a man of vigour and determination but also as a sincere personal friend; to them the unexpected news of his sudden death as he tended his garden was almost unbelievable. He was too young to die—still on the sunny side of 50.

His earlier experience was to come to full fruition after he had taken up the duties of district medical officer in one of Dublin's most populous districts. As the honorary secretary of the District Medical Officers Group of the Irish Medical Association he spent himself freely in the service of patients and colleagues alike: his periodic reports to council and executive committee were always concise, factual, and to the point. When discussion arose on debatable matters, he was always "a bonny fighter"; his clear and incisive presentation of his case was always a tonic as he brushed aside the cobwebs and vigorously maintained the issue at stake. At council meetings, particularly through the long-drawn-out negotiations consequent on the passing of the recent Health Acts, discussion was often keen and tempers might become frayed, yet for all his vigour of expression he was never vindictive: he could always see "the other man's" point of view whilst holding firmly to his own without trace of rancour or bitterness in his heart towards those who differed from him in opinion.

One's thoughts go back now to the Joint Meeting of B.M.A. and I.M.A. in Dublin in 1952, reckoning up the amount of work and energy he devoted to ensuring its success. Then, alas, were sown the seeds of his first breakdown in health. Yet, months later, on his return to our meetings he concealed the permanent impairment of his strength with a smile and a joke on his lips, as if he had just returned from a holiday. In all that he did he consistently gave of his best. At our annual general meeting, when he was president of the association, he was an outstanding success. That meeting, at Bundoran on the shores of Donegal Bay, will long remain in our memories as we speak of him.

He has been indeed the good and faithful servant. To his sorrowing widow and children we tender our most sincere and heartfelt sympathy in their tragic loss.

H. S. ROCH, C.M.G., C.B.E., D.S.O. M.R.C.S., L.R.C.P.

Colonel H. S. Roch, who had a distinguished and varied career in the R.A.M.C., died in Belfast on May 23, aged 83 years.

Horace Sampson Roch was the third and youngest son of Surgeon-General Sampson Roch, of Woodbine Hill, Youghal, who also spent the greater part of his life in the Army Medical Service. Born in Waterford on August 13, 1876, he was educated at a private school before going to King's College Hospital, London, from which he qualified in 1899. He immediately joined the R.A.M.C. and in the same year was drafted to South Africa, where he served with distinction from 1899 to 1902, being awarded the Queen's Medal with six clasps and the King's Medal with two clasps. At the end of the South African War he was transferred to India, where he served until 1905. Returning to England, he was appointed R.A.M.C. Adjutant of the School of Instruction, West Riding Division, Territorial Force, holding this appointment until 1911. On his promotion to major, he returned to South Africa and remained there until 1914, when he was recalled for service in the first world war, in which he was to receive great honours and rapid promotion.

In 1915 he was D.A.D.M.S., first of 28th Division and later of the 7th Division, in 1916 A.D.M.S. of the 2nd Cavalry Division, and in 1917 was promoted colonel and appointed A.D.M.S. of the 36th (Ulster) Division, with which he served until the end of the war. He won his D.S.O. with the 2nd Cavalry Division and while with the Ulster Division he was awarded the C.M.G. in 1919 and the C.B.E. in 1920, and was mentioned in dispatches on five occasions.

After such a lengthy period of service, life might have been dull for this fighting Irishman, so he volunteered for service in Russia and was with the White Russians in 1919–20, being appointed Honorary Colonel in the Russian Imperial Army. Resuming his Army service, he was in Mesopotamia from 1921–3 and then returned to India again for two years, travelling home via China, India, and the United States. He was A.D.M.S., East Anglia Area, in 1926, and from 1927 to 1930 he was back in India as A.D.M.S. of the Lahore District and was appointed Honorary Surgeon to the Viceroy of India. While in India he spent his leaves on walking tours and climbing in the Himalayas. His knowledge of India, of its geography and its problems, was very extensive.

Colonel Roch retired in 1930 and returned to the family home at Woodbine Hill, Youghal, where he was a keen and skilful gardener. He also devoted much time to local relief committee work, particularly the British Legion and the Royal National Lifeboat Institution. He worshipped at St. Mary's Collegiate Church in Youghal and was until recently an active churchwarden.

Colonel Roch had many friends in Belfast and Northern Ireland, both lay and professional, since on the outbreak of the second world war he again volunteered for service and was appointed president of medical boards in Northern Ireland, being stationed in Belfast until 1945.

In 1931 he married Emily Helena, daughter of the Rev. Alexander Crone of Youghal, who with one daughter, wife of William G. Roch-Perks, and one granddaughter, mourn his loss.—J. G. J.

H. L. HEATH, L.M.S.S.A., D.P.H.

Dr. H. L. Heath, formerly visiting physician and honorary bacteriologist to the East Suffolk and Ipswich Hospital, died in May 27 at the Ipswich Nursing Home. He was 87 years of age.

Harry Llewellyn Heath was born on April 14, 1873. Before qualifying L.S.A. in 1898 he studied physiology at Cambridge, Toronto, and Edinburgh. He took the D.P.H. at Cambridge in 1905, the L.M.S.S.A. in 1909, and the L.R.C.P. of Edinburgh in 1916. After holding the appointment of assistant to the professor of materia medica and therapeutics in the University of St. Andrews, he settled in practice in Ipswich at the beginning of the century and remained at work there until his retirement.

Mr. ARTHUR R. HILL writes: In 1908 Dr. Heath was appointed honorary bacteriologist and pathologist to the East Suffolk and Ipswich Hospital, and his was indeed the first appointment in this specialty. Later he became an honorary physician on the hospital staff and for 22 years served first in the one capacity and then in the other. In those early years of the century the pathological department, if it could be so designated, was a small unheated room, now part of the hospital laundry, and Dr. Heath would work often far into the night, sometimes under Arctic conditions, on his cultures and vaccines and specimens. For a short time in 1911 he was medical officer of health for the East Suffolk County Council. It was during that time that an epidemic of bubonic plague broke out in the county, some infected rats having been brought over in a ship from the Far East. As an energetic young man Dr. Heath played an active part in the diagnosis of suspected cases, and in organizing a campaign to track down and kill any black rats. This entailed the examination of the bodies of the rats and the rewarding in cash of those who had caught them. These measures effectively stamped out the peril.

The quality of his work came gradually more and more to be appreciated by his colleagues, and he took a very active part on medical committees, particularly those associated with the modernization, improvements, and extensions to the hospital, and especially the building of a pathological block opened in 1928 by the Princess Royal.

Unlike many pioneers he lived to see most of his plans for improvement come to fruition. He had a large private medical practice, and by his knowledge, compassion, original thinking, personal charm, and devotion to duty earned for himself an honoured place in the opinion of his fellow practitioners, and of real affection in that of his patients. As time went on his reputation extended far beyond the boundaries of East Suffolk, and he was one of that fast-disappearing band of general practitioners whose wisdom and experience led to their being accepted as of consultant status.

His was a rare gift for friendship, enhanced by a deep religious conviction and with an exquisite sense of humour making him an excellent companion and raconteur. A good and sympathetic listener, he knew the value of kindliness as a not unimportant therapeutic ally.

Although he had retired from practice for about ten years, and although many of his generation have passed on, there are a number who thank God for his skill, example, and inspiration, and not the least the writer of this note. It was befitting that during the last two years of his life, when his strngthe was failing, he should have been cared for by those who knew his worth and counted it a privilege to nurse one who had never spared himself in his professional life for his patients. Dr. Heath's wife pre-deceased him some two years ago, and he leaves an only daughter, Miss Monica Heath, to whom we extend our sympathy.

THOMSON HENDERSON, M.D.

Dr. Thomson Henderson, formerly senior surgeon of the Nottingham and Midland Eye Hospital (now known as the Nottingham Eye Hospital), died at Hursley, Hampshire, on May 26 at the age of 83.

Thomson Henderson was born at Leghorn, Italy, where his family had a business. From George Watson's College he went on to study medicine at Edinburgh University, where he graduated M.B., Ch.B., at the age of 21. For a time he was demonstrator of anatomy in the Royal College of Surgeons of Edinburgh, and after qualification he worked as ophthalmic house-surgeon in the Edinburgh Royal Infirmary. After further postgraduate study in Vienna and London he set up in practice in Nottingham in 1904, marrying in the same year, and for nearly half a century he lived and practised at the Ropewalk. In 1909 he was appointed honorary surgeon to the Nottingham and Midland Eye Infirmary in succession to Dr. Bell Taylor. A year later he was awarded the gold medal offered by the 11th International Ophthalmological Congress in Naples for the best paper in connexion with the treatment of hardening of the eye. In August, 1914, he volunteered for medical work in the Army and served throughout the first world war as a captain. In 1926 he gained the Doyne memorial medal at the Oxford Ophthalmic Congress, and for several years his main research work was directed towards discovering the cause of glaucoma and its treatment. Even in his earliest years in Nottingham he undertook research work, installing his own laboratory at his surgery. In 1950 he published a book entitled *Principles of Ophthalmology*. He was also the author of several contributions on ophthalmological subjects. His discoveries brought him world-wide recognition and he was frequently in touch with leading ophthalmologists on the Continent and in America.

Dr. Henderson was president of the Nottingham Medico-Chirurgical Society in 1922–3 and president of the Midland Branch of the B.M.A. in 1935–6. Before this he had represented his Division at several Annual Meetings not long after he went to Nottingham. At the Annual Meeting of the B.M.A. in Nottingham in 1926 he was vice-president of the Section of Ophthalmology. As a relaxation he was fond of golf.

A very able ophthalmologist in his day, Dr. Thomson Henderson will be remembered by many in the city and county of Nottingham. To his wife and sons we extend our deep sympathy.—G. N.

W. GRANT WAUGH, M.D., F.R.C.S.Ed.

The obituary of Mr. W. Grant Waugh was published in the *Journal* of May 21, p. 1575.

G. F. W. writes: A good many people must have felt sad on opening the *Journal* and finding that Bill Waugh has passed away in his new home and work in Canada. My old friend and colleague Sandy Nicol puts things very neatly in the obituary notice, but there are several things I would like to say. To begin with, Bill Waugh was far too big a man for Sunderland, and he very wisely spread his work throughout the North of England and in London. There must be many doctors and their families who are deeply indebted to him for professional care. He attended many medical families, which is always a test of a man's standing. And then there was his dignity, integrity, courtesy, magnanimity, and gentle professional skill. His versatility was truly astonishing and his personal courage exemplary.

WILLIAM MOODIE, M.D., F.R.C.P., D.P.M.

The obituary of Dr. William Moodie was published in the *Journal* of June 4 (p. 1742).

F. M. writes: I and many others had the privilege to serve under Lieutenant-Colonel William Moodie in Gibraltar during the second world war, and I am sure we all owe him a great deal for the kind, understanding, unobtrusive way he carried out his official and unofficial duties as O.C. Medical Division. His tolerance and humanity, his balanced outlook and patience, his wisdom and vision were always at the service of his officers and men. I shall always remember him walking above Sandy Bay in Gibraltar—what an inspiration as an officer, as a psychiatrist and healer, as an unforgettable man, example, and friend.

Drs. GORDON AMBROSE and GEORGE NEWBOLD write: It was with a sense of profound regret that we learned of the death of Dr. William Moodie. There is little doubt that with his passing psychological medicine in particular has lost one of its most outstanding figures. His stature as a physician was in the forefront of British medicine, and, like the late William Brown, of Oxford, and J. A. Hadfield, still, happily, with us, he did much to increase our understanding of the treatment of mental illness. In his later years Moodie became keenly interested in the application of hypnotic methods to psychotherapy, and was the respected and popular chairman of the Hypnotherapy Group. Not only did he do us the honour of contributing a foreword to our own *Handbook of Medical Hypnosis*, but his last work, published shortly before his death, was entitled *Hypnosis in Medicine*. To the end he retained his active and inquiring mind, and his warm humanity and store of practical wisdom endeared him to patients and professional colleagues alike.

JOHN F. FULTON, O.B.E., M.D., D.Sc., D.Litt. LL.D., F.R.C.P.

The obituary of Dr. John F. Fulton was published in the *Journal* of June 11 (p. 1815).

We are indebted to Dr. HENRY R. VIETS, of Boston, for the following appreciation: Some time in the autumn of 1925 I first met John Fulton in Boston at the house of Edward Streeter, a distinguished amateur medical historian. Fulton was a medical student, and I, ten years his senior, was a junior instructor in the Harvard Medical School. Streeter, surrounded by his books, took us on a glorious personally conducted tour through Florence with Antonio Benivieni and Tadeo Alderotti, introducing us at the same time to other delightful medical humanists with euphonious names—Niccolo Leoniceno, Symphorien Champier, François Rabelais, Paolo Bagellardo, Thierry de Hery, Berengario da Carpi, and a host of others. We walked away on air, thoroughly infused with the spirit of the *Quattrocento* as only Streeter could instil it into our amateur minds.

Again on the sunny terrace at Topsfield, his wife's home in Massachusetts, in the summer of 1926 I have another picture of a very earnest young man swamped with galley proofs of a forthcoming book entitled *Muscular Contraction*, to be published that November. So absorbed was he that only the stern but gentle persuasiveness of his host could call him to lunch.

Again in 1928 at 29, Charlbury Road in Oxford, a renovated house with four new bathtubs and central heating, his corner room upstairs became a bookshop of rarities where he nested almost continuously, while his wife and I ran off to an auction at Garsington Manor, not forgetting to glimpse the glorious view of the Chilterns from the church on the ridge, before we rolled home down Shotover Hill to tea and crumpets. We left him, too, for Wytham strawberries and Devonshire cream at the Trout Inn, paying our respects at the same time to the ruins of Godstow Nunnery, the gift of Henry VIII to his favourite physician, George Owen. I never knew whether the nuns went with it, but perhaps it does not matter now. So home across the Port Meadow, as old as the Domesday Book, to find him still absorbed in *Selected Readings*, and soon to be the new professor of physiology at Yale, at the age of 29.

We met years later in San Francisco in 1946, he on a holiday, having just gotten off the page proof and index of *Harvey Cushing* and acquired new bifocals from Meyerwitz in St. Paul, the firm his father brought to Minnesota so many years before. We lunched on the "top of the Mark" and had a glorious, gay dinner at the Bohemian Club with Johnnie Lawrence showing us the first A-bomb pictures, and he talked delightfully about H. C. I have never seen him so blithe—a new Fulton on the crest of a new career in medical history.

John Fulton gave much pleasure to others. Even outdistanced, one always got fleeting glimpses of him forging ahead and felt the inspiring pull of his personality. For all this and much more we are eternally grateful.

CHARLES SINGER, M.A., M.D., D.Litt. Hon.D.Sc., F.R.C.P.

The obituary of Professor Charles Singer was published in the *Journal* of June 18 (p. 1897).

Dr. DOUGLAS GUTHRIE writes: The history of medicine has lately lost several of its well-known exponents. The death of Henry Sigerist, his work still unfinished, was a great blow, as also, much more recently, was that of the gay and enthusiastic John Fulton. Each was at the height of his fame; each a well-loved personality.

Now, to our sorrow, we have sadly learned of the passing of that doyen of medical historians, Professor Charles Singer, unquestionably the leader of his colleagues in this field, as well as in the history of science. Others will describe and assess the value of his work; the present writer wishes merely to add a humble personal tribute.

Singer was an elder brother in the ranks; his opinion was highly valued, and it is difficult to realize that medical history must continue to work without his guidance. Not only was he a wise and capable scholar whose judgment was highly valued; he was also a most helpful friend to all who were interested in the fascination of medical and scientific history. His advice and assistance were gladly and promptly placed at the disposal of every inquirer, however junior or inexperienced. Those who, like the writer, were fortunate enough to enjoy the warm hospitality of Dr. and Mrs. Charles Singer in their lovely Cornish home realized very fully how far-reaching was their contribution to the historical aspect of medicine and science, and to the humanism which such a study adds to to-day's knowledge.

Charles Singer's writings remain as a worthy memorial, but there is also remembered by his many pupils and colleagues the charming kindness of this humble and able scholar. Deep sympathy will be felt for Mrs. Dorothea Singer, herself a renowned historian and a helpmeet in every sense of the term, who for so many years was the perfect complement to her distinguished husband.

Medical Notes in Parliament

MINISTER ON SPIRITUAL HEALERS

[FROM OUR PARLIAMENTARY CORRESPONDENT]

The Minister of Health, answering questions on June 20 about the admission of spiritual healers to Health Service hospitals, stated his opinion that this should be a matter for local decision by each hospital authority, subject to two factors—the patient must first ask for such a visit; and the hospital authority must then exercise its discretion in the light of the views expressed by the doctor in charge of the case.

In reply to Dr. DONALD JOHNSON (Carlisle, Con.) and Mr. KENNETH ROBINSON (St. Pancras, North, Lab.), of whom the latter asked specifically about the National Federation of Spiritual Healers, Mr. D. WALKER-SMITH said: "I have not given guidance to hospital management committees, as I consider on present advice that the visiting of patients is a matter which should be left to the hospital authority's discretion in the light of the views of the doctor in charge of the particular patient who has asked for the visit. While I do not know the practice of individual committees, they are generally aware of my view."

B.M.A.'s View

Mr. KENNETH ROBINSON asked if the Minister had seen the view expressed by the B.M.A. at its annual conference condemning the introduction of these healers into hospitals? While not wishing to express a view either way about the merits of this federation, did not the Minister think this was a matter in which he should give guidance to hospital authorities, rather than leave it to individual authorities? These healers were reported to be present in 50% of hospitals run by management committees. Mr. WALKER-SMITH said he had seen recent press reports about the proceedings of the B.M.A., but had not received any representations following therefrom. If he was right about factors governing these cases it must always be ultimately a matter for local decision in the light of those factors, and therefore general guidance beyond what he had already said would not appear to be appropriate.

Dr. EDITH SUMMERSKILL (Warrington, Lab.) asked if she was to understand that the Minister had said that a regional board could make a decision in favour of these visits but a doctor could only refuse in a specific case. Could a doctor refuse to have a spiritual healer attending any of his patients on the ground of principle? Mr. WALKER-SMITH said the question did not arise unless a particular patient asked for a visit. That having been done, it was a matter for the discretion of the hospital authority whether a visit should be sanctioned. In coming to that decision the hospital authority would give due weight to the opinion of the doctor in charge of the case.

A Matter of Liberty

Mr. R. T. PAGET (Northampton, Lab.) asked if this was not a matter of liberty. If somebody in hospital wanted a chap to come and pray over him, why shouldn't he? Mr. WALKER-SMITH described that as a characteristic oversimplification. He was not at all out of sympathy with what had been said, but there were also clinical matters involved, and that was where the view of the doctor came in. He was certain that on a common-sense and compassionate application of the principles to which he had referred justice could be done in each of these circumstances but in accordance with the local considerations involved. Mr. GEORGE ROGERS (Kensington, North, Lab.) said that thousands of spiritualists regarded this as a matter of religious liberty, feeling that, just as a Catholic was entitled to have his priest, so the spiritualist was entitled to have the benefit of his healer.

Vital Statistics

Home Confinements in London

During the 13 weeks ended April 2, 1960, the number of home confinements in London amounted to 2,760—18.6% of the total births in the first quarter of the year. A doctor was booked for about half the home confinements, and analgesia was given to 86% of the mothers.

Changing Causes of Death in Colonial Territories

The pattern of the principal causes of death and disease in the colonial territories is changing. Deaths from infectious, parasitic, and other preventable diseases are falling in relation to those due to cardiovascular and cerebral diseases, cancer, and accidents. This can be interpreted as one result of successful measures to prevent diseases such as malaria, but a high proportion of deaths still occur in children under 5 years of age.—*The Colonial Territories, 1959–60*, H.M.S.O., London. Price 6s. 6d.

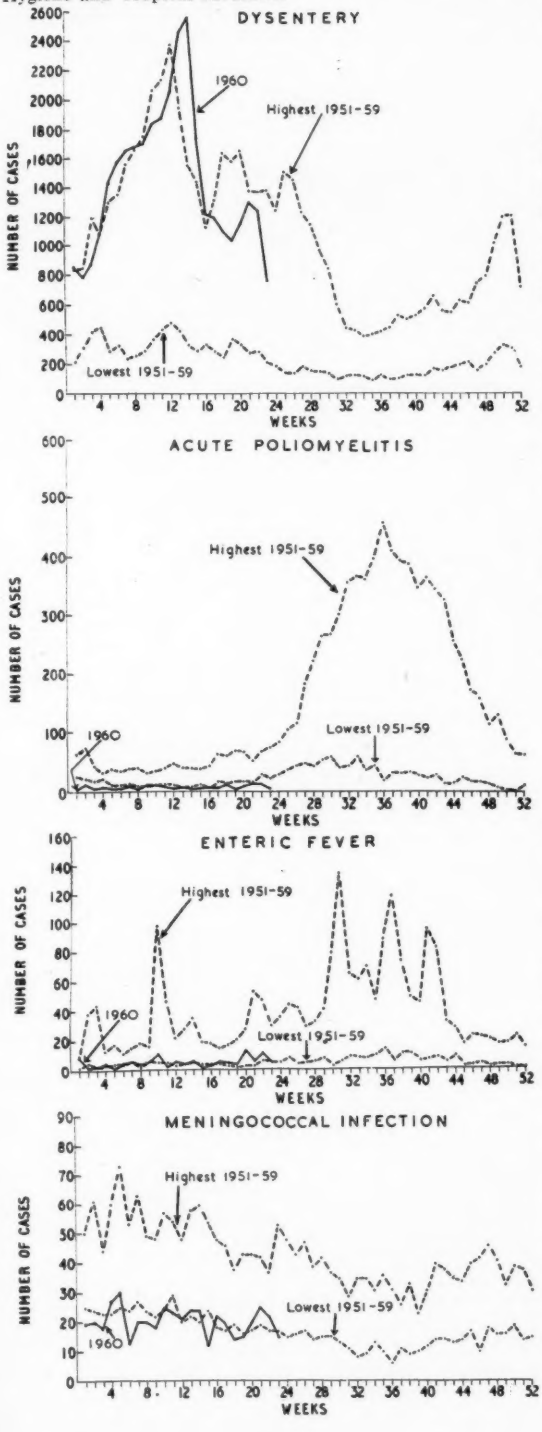
Week Ending June 11

Areas where the numbers of notifications were high in the latest two weeks for which figures are available.

	Week Ending June 4	Week Ending June 11
Dysentery		
Essex	58	**41**
Ilford M.B.	13	**12**
Kent	34	**28**
Lancashire	223	**119**
Liverpool C.B.	19	**29**
Accrington M.B.	19	**11**
Rawtenstall M.B.	1	**11**
London	202	**103**
Islington	61	**22**
Nottinghamshire	63	**26**
Worksop R.D.	36	**19**
Sussex	23	**40**
Uckfield R.D.	8	**19**
Yorkshire West Riding	145	**74**
Bradford C.B.	25	**11**
Leeds C.B.	24	**13**
Sheffield C.B.	19	**16**
Glamorganshire	25	**23**
Cardiff C.B.	2	**11**
Glasgow	106	**104**
Whooping-cough		
Kent	20	**127**
Chislehurst and Sidcup U.D.	4	**32**
Lydd M.B.	0	**44**
Measles		
Lancashire	911	**742**
Liverpool C.B.	291	**221**
Manchester C.B.	115	**82**
Food-poisoning		
London	28	**65**
Southwark	1	**48**
Wiltshire	0	**28**
Calne and Chippenham R.D.	0	**27**
Gloucestershire	6	**43**
Gloucester R.D.	0	**31**
Cheshire	9	**34**
Birkenhead C.B.	4	**26**
Diphtheria		
Yorkshire East Riding	0	**2**
Kingston upon Hull C.B.	0	**2**

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the years 1951–9 are shown thus ------, the figures for 1960 thus ———. Except for the curves showing notifications in 1960, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **June 4** (No. 22) and corresponding week 1959.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the whole of England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES	1960					1959				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria ..	1	0	1	0	1	1	0	2	0	
Dysentery ..	1,236	202	175	31	8	924	88	229	24	12
Encephalitis, acute	4	0	0	0		2	0	0	0	
Enteric fever:										
Typhoid ..	3	1	0	0		1	0	0	0	1
Paratyphoid ..	8	0	0	0		7	3	0	0	
Food-poisoning ..	200	28	23	4		271	35	3	0	
Infective enteritis or diarrhoea under 2 years				26	22				11	20
Measles*	2,488	137	38	3	7	14,801	572	309	424	166
Meningococcal infection	22	0	17	2		18		7	0	
Ophthalmia neonatorum	26	0	1	0		19	4	10	0	
Pneumonia† ..	214	12	135	2	5	219	11	126	2	
Poliomyelitis, acute:										
Paralytic ..	5	0	0	0	4	31	11	3	1	
Non-paralytic ..	6	2	0			11	3	2		
Puerperal fever§ ..	163	26	13	3		203	42	66	1	
Scarlet fever ..	547	40	49	12	9	970	44	51	21	22
Tuberculosis:										
Respiratory .	423	52	75	17		553	71	97	28	
Non-respiratory	71	8	14	10		82	6	22	2	
Whooping-cough	1,483	112	256	14	45	632	24	67	31	110

DEATHS	1960					1959				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	0	0		0		1	0		11	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	5	0	0	0	0	6	0	0	0	1
Influenza	6	0	1	0	0	5	0	0	0	0
Measles		0	0	0	0		0	0	0	1
Meningococcal infection		0	0				0	0		
Pneumonia ..	403	28	16	10	2	357	26	12	10	4
Poliomyelitis, acute	0	0		0	0	2	0		0	0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory ..	63	6	6	0	2	57	2	6	1	3
Non-respiratory		0	0	0	0		0	1	0	0
Whooping-cough	0	0	0	0	0	0	0	0	0	0
Deaths 0–1 year ..	275	18	28	2	7	290	39	24	8	10
Deaths (excluding stillbirths) .	9,148	680	564	103	154	8,576	722	491	130	127
LIVE BIRTHS ..	15,413	1281	1051	293	511	15,054	1304	974	297	417
STILLBIRTHS ..	339	21	23			294	25	21		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

Chair of Biochemistry, London University

Dr. H. HARRIS, reader in biochemical genetics at the London Hospital Medical College, has been appointed to the London University chair of biochemistry, tenable at King's College.

Dr. Harris, who is 40, was educated at Manchester Grammar School and Trinity College, Cambridge, qualifying M.B., B.Chir. in 1943, M.A. in 1946, and M.D. in 1948. He was house-physician at Sunderland Royal Infirmary from 1943 to 1944, and then, till 1947, served in the Air Force as medical officer. He went to the Galton Laboratory, University College, London, as research assistant in 1947, and to the department of biochemistry there as lecturer in 1950. He became senior lecturer in the London Hospital Medical College's department of biochemistry in 1953, and took up his present post there in 1958. His research work has been mainly in the field of human biochemical genetics.

Psychosomatic Medicine and Childbirth

An international congress on psychosomatic medicine and childbirth is to be held from September 12 to 15, 1961—possibly in Paris, Vienna, or Geneva.

The main subjects for discussion are psychological and sociological study of the woman in connexion with her pregnancy, labour, and the puerperium; psycho-physiology of the pain of labour; theory, practice, and results of combined psychological and physical preparation for labour; and the value and the limitations of the psychosomatic methods in obstetrics. Those wishing to contribute are asked to send an outline of their papers to Professor NORMAN MORRIS, Charing Cross Hospital Medical School, London, W.C.2.

Grants, Gifts, and Bequests

The Nuffield Provincial Hospitals Trust has made a grant of £25,000 to P.E.P., the independent research organization, for a three-year study of the mental health services.

Mr. WARWICK JAMES, F.R.C.S., who qualified from the Royal Dental Hospital of London, School of Dental Surgery, in 1898, has given £22,000 of 2½% Consolidated Stock to the School to endow a research fund in dental anatomy.

The late Mr. FRANK BARNES, formerly lecturer in anatomy and operative surgery in the University of Birmingham, who died on February 18, aged 91, has left the residue of his £137,461 estate to the medical school there, including particularly the library and lecture room. A photograph of the Barnes Library, which shares his name with that of Stanley Barnes, is on p. 1348 of the *Journal*, December 12, 1959.

Margaret McMillan Centenary

The centenary of MARGARET MCMILLAN, the child-welfare reformer, is to be celebrated in London and Bradford at the beginning of July, and by a symposium of personal appreciations to be published on July 19.

Her major achievements included the first school baths in the country, the first school medical inspection—her friendship with Sir ROBERT MORANT, permanent secretary to the Board of Education, led to the 1907 Act of Parliament authorizing school medical inspections with power to give treatment—special education for backward and defective children, school meals, and the creation of a new kind of open-air nursery school. The first of these schools was built in Deptford in 1914. A training school for students to carry on her work dedicated to her sister, RACHEL MCMILLAN, was opened in 1930. (The photograph is published by courtesy of Miss M. DAVIES, principal of the Rachel McMillan Training College.)

Dental and Medical Society for Study of Hypnosis

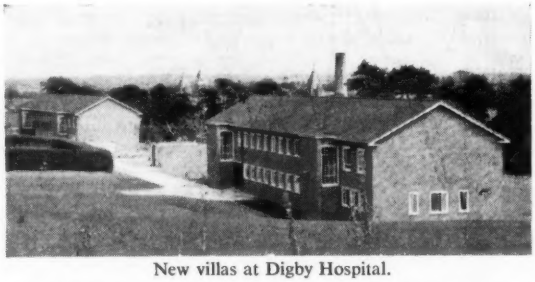
The following officers have been elected to the Dental and Medical Society for the Study of Hypnosis for the ensuing year: *president*, Dr. M. J. FENTON; *chairman of council*, Mr. E. E. WOOKEY; *honorary treasurer*, Mr. M. RITBLAT; *honorary secretary*, Mr. S. SHINDLER.

Toxic Chemicals in Agriculture

Sir CHARLES DODDS, F.R.S., is to succeed Sir SOLLY ZUCKERMAN as chairman of the interdepartmental Advisory Committee on Poisonous Substances used in Agriculture and Food Storage.

Digby Hospital, Exeter

The DUCHESS OF KENT opened extensions costing £250,000 at the Digby Hospital for psychiatric patients, near Exeter, on June 8.



New villas at Digby Hospital.

The extensions include the Russell Clinic, which houses 44 beds and a modern treatment unit, two 44-bed villas, staff houses, and flats for senior nurses. The kitchen has been modernized and the engineering and laundry services improved.

Noise

The Committee on the Problem of Noise, appointed by the Minister for Science "to examine the nature, sources, and effects of the problem of noise and to advise what further measures can be taken to mitigate it," is now ready to receive evidence from persons and organizations with special interest or experience in matters relevant to the problem. Anyone wishing to give evidence should first write to the Committee's secretary, Mr. R. S. MATTHEWS, Ministry of Health, Savile Row, London, W.1.

Dr. Fox's Appeal Dismissed

The Judicial Committee of the Privy Council has dismissed the appeal of Dr. Kenneth Merrall Fox against the decision of the Disciplinary Committee of the G.M.C. on November 27, 1959, that his name should be erased from the *Medical Register* (*Supplement*, December 5, p. 183). Their Lordships will deliver the reasons for their judgment later (*The Times*, June 21).

In Brief

The Postgraduate Medical School heart surgery team (Mr. W. P. CLELAND, Dr. D. G. MELROSE, Mr. H. H. BENTALL, and Dr. A. HOLMAN) have been carrying out a demonstration series of intracardiac surgical procedures with the use of the extracorporeal circulation in Helsinki, Finland.

Singapore has banned the export of wild animals and birds by sea since the death in a French ship of about 360 monkeys out of a consignment of 1,000 bound for Europe.

Australia's Royal Flying Doctor Service has added dentistry to its services for the first time. It is providing a flying dental clinic for people living in the outback districts of New South Wales, South Australia, and Queensland.

People in the News

Dr. A. C. DOUGLAS, senior registrar, respiratory diseases units, Northern General and City Hospitals, Edinburgh, has been awarded a Chest and Heart Travelling Fellowship of £250 and will spend five weeks in America.

Dr. A. PINEY has been elected Membre Titulaire de la Société Internationale d'Hématologie.

Mr. T. D. WHITTET, Ph.D., chief pharmacist and lecturer in pharmacy at University College Hospital and Medical School, has been awarded the 1959 Evans Medal for outstanding contributions to pharmacy in the public service.

COMING EVENTS

Biochemical Society.—395th meeting Department of Biochemistry, University of Cambridge, June 29, 30, 10.30 a.m. each day.

Bone and Tooth Society.—Annual general meeting and programme of casual communications, July 6, 4 p.m., 234, Great Portland Street, London, W.1.

British Association of Allergists.—General meeting, Brockham Park, July 2, 10 to 4.30 (tea). Details from Dr. A. W. FRANKLAND, Honorary Secretary of the B.A.A., Wright-Fleming Institute, St. Mary's Hospital, London, W.2.

British Tuberculosis Association.—Annual Conference including joint meeting with the Society of Medical Officers of Health, Oxford, July 6–9. Applications, by June 30, to the Administrative Secretary, British Tuberculosis Association, 59, Portland Place, London, W.1 (MUS 3810).

Nightingale Training School.—Exhibition to mark St. Thomas's Hospital Nightingale Training School centenary at Doulton Hall, Doulton House, Lambeth High Street. Open until July 10, 10 a.m. to 6 p.m., Wednesdays 8 p.m.

Royal Medical Foundation of Epsom College.—Annual general meeting of governors (regular subscribers of £1 1s. a year), July 13, 3.30 p.m., Council Room, Medical Defence Union, B.M.A. House (Entrance D, South), Tavistock Square, London, W.C.1.

Open Invitation.—Weekend symposium: "Medical Education." Stuttgart, July 30–31. Sponsors: Anglo-German Medical Society. Inquiries to Honorary Secretary, c/o Department of Chemical Pathology, St. Mary's Hospital, London, W.2.

National Society for Clean Air Conference.—Harrogate, October 5–7. Written papers are invited for the open sessions. Details from the Director of the Society, Palace Chambers, Bridge Street, London, S.W.1.

1st International Congress of Nephrology.—Geneva and Evian, September 1–4. Details from Dr. A. A. G. LEWIS, secretary of Renal Association, c/o Ciba Foundation, 41, Portland Place, London, W.1.

NEW ISSUES

JOURNAL OF CLINICAL PATHOLOGY

The Diagnosis, Epidemiology and Control of Urinary Infection in Urology and Gynaecology. W. A. Gillespie, K. B. Linton, A. Miller, and N. Slade.

Tyramine-producing Streptococci in Neonatal Diarrhoea. E. Y. Bridson and Jean Brown.

The Influence of Mechanical Factors on the Structure of the Peripheral Arteries and the Localization of Atherosclerosis. J. H. Robertson.

Angiosarcoma of the Heart. Hilda R. Harris.

Increased Mitotic Activity in the Liver and Other Organs in a Case of Acute Renal Tubular Necrosis. I. W. Simson and W. J. Pepler.

A Haemorrhagic Disorder in Pregnancy Due to an "Anticoagulant" Preventing the Conversion of Fibrinogen to Fibrin. S. J. Baker and E. Jacob.

Antifibrinolytic Activity in Normal Pregnancy. J. J. Biezenski.

Fibrinolytic and Antifibrinolytic Activity in Pregnancy. S. S. Naidoo, M. Hathorn, and T. Gillman.

The Possible Relationship Between the Antiheparin Activity of Serum and Thrombosis. L. Poller.

Aminoaciduria and Megaloblastic Anaemia. D. Fowler, E. V. Cox, W. T. Cooke, and M. J. Meynell.

Antibody of Blood-group Specificity in Simple ("Cold") Haemolytic Anaemias. W. Weiner, N. K. Shinton, and I. R. Gray.

Syphilitic Paroxysmal Cold Haemoglobinuria. D. J. Parish and J. R. A. Mitchell.

Serum Iron Determination. D'A. Kok and F. Wild.

The Determination of Serum Iron after the Intravenous Injection of Iron-dextran. D. Webster.

An Improved White Cell Diluent for Use with the Eel Electronic Blood Cell Counter. F. Taylor and A. G. Rickards.

Serum Transaminases and Isocitric Dehydrogenase in Kwashiorkor. D. N. Baron.

The Buffered Performic-Acid-Alcian-Blue-Periodic-Acid-Schiff Method for the Differentiation of Basophils in the Human and Rat Pituitary. K. Swettenham.

Misleading Sputum Cartons. C. G. A. Thomas and F. J. Gibbs.

Technical Methods:

A Survival Technique for Obtaining Large Volumes of Blood from Rodents. G. Mouzas and Jacqueline B. Weiss.

A Rapid Method of Bleeding Mice. K. M. Adams.

A Method for the Simultaneous Separation of Human Thrombocytes and Leucocytes. D. Nelken, N. Gilboa-Garber, and J. Gurevitch.

Nomogram for the Computation of the Corrected Colour Value in 17-Ketosteroid Estimation by the Zimmerman Reaction. A. P. Kenny.

A Micro Ultrafiltration Apparatus. R. H. Wilkinson.

Association of Clinical Pathologists: 64th General Meeting.

Book Reviews.

Volume 13, No. 3. (Bi-monthly; £4 4s. annually.)

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, June 27

INSTITUTE OF DERMATOLOGY.—At British Institute of Radiology, 5 p.m., Mr. I. Muir: Reconstructive Surgery and Malignant Disease.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. Brian Ackner: Aches and Pains of Psychogenic Origin.

Tuesday, June 28

INSTITUTE OF DERMATOLOGY.—At British Institute of Radiology, 5 p.m., Dr. A. W. G. Goolden: Carcinogenic Effects of Irradiation.

Wednesday, June 29

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. W. Riddell: Histopathology of Fungus Infections.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Mr. D. Barlow: Surgical Problems of Hiatus Hernia and other Diaphragmatic Herniae.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. R. W. Riddell: Diseases Due to Fungi.

ROYAL FREE HOSPITAL, Gray's Inn Road, W.C.—5.15 p.m., Dr. Seymour S. Kety (National Institute of Mental Health, Bethesda): Current Biochemical Concepts of Schizophrenia.

Thursday, June 30

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Mr. A. K. Monro: Malignant Melanoma, Clinical and Pathological.

NUFFIELD ORTHOPAEDIC CENTRE, OXFORD.—8.30 p.m., Dr. Isidore Cohn (New Orleans): Rudolph Matas, the Pioneer of Vascular Surgery.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. J. F. Goodwin: Rare Disorders of Heart Muscle.

Friday, July 1

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. S. C. Gold: clinical demonstration.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. J. L. Livingstone: clinical demonstration.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Professor John Bruce: Cancer of the Breast.

SOCIETY OF MEDICAL OFFICERS OF HEALTH: WELSH BRANCH.—At B.M.A. Regional Office, 195, Newport Road, Cardiff, 6.30 p.m., annual general meeting. Election of officers, etc.

APPOINTMENTS

NORTH-WEST METROPOLITAN REGIONAL HOSPITAL BOARD.—A. J. Harrold, M.B., B.S., F.R.C.S., Consultant Orthopaedic Surgeon, Paddington General Hospital and St. Mary's Hospital (joint appointment); W. A. Watt Maney, F.R.C.S.Ed., F.R.F.P.S., Consultant Orthopaedic Surgeon, West Middlesex Hospital, Clayponds Wing of King Edward Memorial Hospital and St. Bernard's Hospital; S. Silbermann, F.R.C.S., D.L.O., Consultant Ear, Nose, and Throat Surgeon, Watford Hospital, Barnet General Hospital, Potters Bar and Clare Hall Hospitals; G. T. F. Braddock, M.B., B.Chir., F.R.C.S., F.R.C.S.Ed., Consultant Orthopaedic Surgeon, King Edward Memorial Hospital and Clayponds Wing, West Middlesex Hospital and St. Bernard's Hospital; H. G. Smyth, M.B., Ch.B., Assistant Psychiatrist (S.H.M.O.), Bromham Hospital and Hasells Hall; G. Z. Brett, M.D., Director of Mass Radiography Units, and Consultant Chest Physician; A. Maria Burrows, M.B., B.S., Admissions Officer, Central Middlesex Hospital; H. Jackson, F.R.C.S.Ed., D.O., Consultant Ophthalmologist, Central Middlesex Hospital, Neasden Hospital and Mount Vernon Hospital.

RICHES, H. R. C., M.D., M.R.C.P., Consultant Physician, Harefield Hospital, Middlesex.

BIRTHS, MARRIAGES, AND DEATHS

DEATHS

Ashby.—On June 1, 1960, at her home, Runfold, Surrey, Elizabeth Labrey Ashby, M.B., Ch.B., aged 73.

Clover.—On May 30, 1960, at his home, Kingshurst, Kempsey, near Worcester, Martin Clover, M.R.C.S., L.R.C.P., aged 88.

Craig.—On May 26, 1960, Joseph Murison Craig, M.B., F.R.C.S., of Amersham Hill Lodge, High Wycombe, Bucks, aged 65.

Davidson.—On June 4, 1960, in a London nursing-home, George Stewart Davidson, M.B., F.R.C.S.Ed., F.R.C.O.G., of Le Taillis, Les Ruisseaux, St. Brelade, Jersey.

Fuller.—On May 25, 1960, in hospital, Ralph Christopher Fuller, L.R.C.P.&S.Ed., L.R.F.P.S., of 4, Sussex Court, Bognor Regis, Sussex.

Hallinan.—On May 28, 1960, Thomas John Hallinan, C.B.E., M.B., B.S., D.P.H., Major, R.A.M.C., retired, of Ropley, Irish Town, St. Andrews, Jamaica, formerly of Iraq, aged 74.

Halton.—On May 13, 1960, at the Royal Infirmary, Liverpool, Henry Halton, M.B., C.M., of 39, Croxteth Road, Sefton Park, Liverpool, aged 89.

Heath.—On May 27, 1960, at the Ipswich Nursing Home, Harry Llewellyn Heath, L.R.C.P.Ed., D.P.H., of Ipswich, Suffolk.

Henderson.—On May 28, 1960, Thomson Henderson, M.D., of North End House, Hursley, Winchester, Hants, formerly of Normanton House, Plumtree, Notts, aged 83.

Hewitt.—On May 30, 1960, Bernard David Hewitt, M.B., Ch.B., D.Obst.R.C.O.G., D.C.H., of Pinner, Middx, formerly of Didsbury, Manchester, aged 27.

Hingston.—On May 29, 1960, at Walton-on-Thames, Surrey, Alfred Alwyne Hingston, T.D., M.B., C.M., formerly of King's Norton, Birmingham, aged 88.

McGregor.—On June 3, 1960, at Holborn View, Thurso, Caithness, John Grant McGregor, M.B., Ch.B., J.P., aged 77.

Magowan.—In February, 1960, in New Zealand, the result of a climbing accident, Samuel Edgar Magowan, M.D., of Rosebank, Holywood, Co. Down, Northern Ireland.

Mills.—On May 29, 1960, at Lowestoft Hospital, Lawrence Hitchen Barfoot Mills, M.B., Ch.B., aged 86.

Rowlette.—On May 28, 1960, in London, Lionel Matthew Rowlette, D.S.O., *M.C.*, L.R.C.P.&S.I. & L.M., D.P.H., Colonel, late R.A.M.C., retired.

Steinbach.—On May 27, 1960, at Newton House, Knaresborough, Yorks, Charles Horace Steinbach, M.R.C.S., L.R.C.P., aged 78.

Any Questions ?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Permissible Exposure to Radiation

Q.—*An electronic expert is considering employment where he may be exposed to a radiation level of 7.5 millirontgens per hour of gamma and beta rays. What is the health hazard involved, and for what length of time could this radiation be tolerated with safety ?*

A.—For those who are occupationally exposed to ionizing radiations the *Recommendations of the International Commission on Radiological Protection* (Pergamon Press, London) are applicable. For penetrating radiation (such as γ-rays) " the maximum permissible dose accumulated in the gonads, the blood-forming organs, and lenses of the eyes at any age over 18 shall be governed by the relation $D=5(N-18)$ where D is tissue dose in rems and N is age in years " (paragraph 47). Assuming a 40-hour working week, therefore, the *average* permissible dose-rate can be calculated as 2.5 m.rem per hour. But paragraph 49 says " to the extent that the formula permits an occupationally exposed person may accumulate the maximum permissible dose at a rate not in excess of 3 rems during any period of 13 consecutive weeks. . . . If necessary, the 3 rems may be received as a single dose." Therefore a dose-rate of 7.5 m.rem per hour is permissible for limited periods.

β-rays penetrate only small distances. Thus the permissible dose for skin is 8 rems per 13 weeks (paragraph 52) or 20 rems if the exposure is to limited parts such as hands and forearms.

Paragraph 30 states: " The permissible dose for an individual is that dose, accumulated over a long period of time or resulting from a single exposure, which, in the light of present knowledge, carries a negligible probability of severe somatic or genetic injuries ; furthermore, it is such a dose that any effects that ensue more frequently are limited to those of a minor nature that would not be considered unacceptable by the exposed individual and by competent medical authorities."

Tobacco-chewing and Gastric Carcinoma

Q.—*Is there any known connexion between tobacco-chewing and gastric cancer ?*

A.—There is no evidence of any connexion between tobacco-chewing and gastric cancer, unlike the relationship between tobacco-smoking and lung cancer. There is no experimental evidence in animals that carcinoma develops when carcinogens are placed in the stomach. Carcinogens are present in tobacco, and it is likely that weak doses are liberated in the stomach when tobacco is chewed. There is no clinical evidence, however, that carcinoma of the stomach is produced by this means.

Sensitivity to Insulin

Q.—*An elderly patient with severe neglected diabetes mellitus is sensitive to all types of insulin ; adrenaline for drug sensitivity, of course, augments his diabetes. Could you please advise on his management if he goes into diabetic coma ?*

A.—If the patient goes into diabetic coma he will require soluble insulin in large doses, and this must be given. It is not strictly accurate to say that adrenaline augments the diabetes, since its action is to cause glycogenolysis and hence hyperglycaemia. It does not exacerbate the ketosis which is the dangerous defect of diabetes. There would therefore be no harm in using adrenaline to counteract sensitivity. Antihistamines which can be given intravenously, such as promethazine hydrochloride and chlorpheniramine, could also be used. Similarly, intravenous hydrocortisone is valuable in severe hypersensitivity, though this would also augment hyperglycaemia, its action being on gluconeogenesis.

Some drug firms produce small amounts of very highly purified insulin, and it might be worth inquiring whether supplies of this are available. Sensitivity is usually due to impurities rather than to the protein.

Continued Exposure to Drug Allergen

Q.—*A patient taking tablets containing promethazine hydrochloride and amylobarbitone develops a generalized rash unless she takes an antihistamine at the same time. Is it safe to continue this combination of drugs and, if so, for how long ?*

A.—It is not wise to continue treatment with a drug which produces an allergic reaction. This is especially so when the condition treated is not serious and other chemically different but pharmacologically similar drugs are available. It is always possible that, besides affecting the skin, other organs such as the bone-marrow or liver might be affected.

Inheritance of Epilepsy

Q.—*A girl whose father is an epileptic intends marrying a man who also has a family history of epilepsy. Does this increase her chance of having epileptic offspring, and, if so, what are the probable chances ?*

A.—The risk here of epileptic offspring is small. Only the relatively rare myoclonic epilepsy appears to be recessively inherited, and so the effect of having epilepsy on the other side of the family will merely be additive, and the total risk is probably not more than about 3%.

NOTES AND COMMENTS

Softening of the Cervix.—Mr. J. A. STALLWORTHY (Oxford) writes: A slight addition to the answer given to the question " Does softening of the cervix occur otherwise than in pregnancy ? " (May 28, p. 1674) may be of help to some readers. Cervical softening can often be detected on digital examination and be very obvious when the cervix is instrumentally dilated in the following conditions: metropathia haemorrhagica; in the presence of a granulosa-cell tumour or theca-cell tumour of the ovary; in many cases of second- and third-degree prolapse, particularly in the aged; and in carcinoma of the body of the uterus. The association of cervical softening with the latter condition is not known as widely as it should be and can at times be a useful clinical sign. Conversely, when the cervix is firm and does not dilate easily in a case of post-menopausal bleeding it is seldom that one will find a carcinoma of the corpus.

The photograph of Professor Charles Singer which appeared with his obituary notice (June 18, p. 1897) was taken by Dr. E. Ashworth Underwood in August, 1958.

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Index at front of 1960, v. 1, Jan. - Mar.